

Illinois Department of Transportation

To:

Anthony J. Quigley

Attn: John Baczek

From:

Jack A. Elston

By: Michael Brand 1995

Subject: Pavement Design Approval

Date:

August 23, 2019

Route: I-90/94

Job No.:

C-91-310 & 311-15

Section: 2015-018R & 019R

Contract No.: 62A76 & 62A77

County: Cook

Limits: at I-290 (Circle Interchange)

Target Letting: April 2020

We have reviewed the pavement design for the above referenced projects which were submitted on August 7, 2019. The scope of these reconstruction projects is to provide new I-90/94 mainline lanes, NB C-D Road, SB Access Road, I-90/94 at I290 Interchange Ramps, I-90/94 Ramps at various streets, Accident Investigation Site, IDOT Maintenance Lot, and SB Mainline Pavement Widening at the south project limits.

We concur with the District's determination this is a "special design" due to the volume of traffic, the need for ramp pavement to match mainline, and the need for the widening to match existing; and as such, a life cycle cost analysis is not required.

In summary, the approved pavement designs are as follows:

I-90/94 Mainline Lanes

12.5" CRC Pavement with tied PCC Shoulders 4" HMA Stabilized Subbase

12" Aggregate Subgrade Improvement

I-90/94 at I-290 Ramps (NW/SE/SW/ES/EN/WS/WN);

NB CD Road; SB Access Road

11" PCC Pavement with tied PCC Shoulders

4" HMA Stabilized Subbase

12" Aggregate Subgrade Improvement

I-90/94 Ramp at Lake St

9.25" PCC Pavement with tied PCC Shoulders

4" HMA Stabilized Subbase

12" Aggregate Subgrade Improvement

1-90/94 Ramp at Randolph St/Washington/Blvd/Madison St/ Adams St/ Jackson Blvd/Roosevelt Rd

9" PCC Pavement with tied PCC Shoulders

4" HMA Stabilized Subbase

12" Aggregate Subgrade Improvement

1-90/94 Ramp at Taylor St

9.75" PCC Pavement with tied PCC Shoulders

4" HMA Stabilized Subbase

12" Aggregate Subgrade Improvement

IDOT Maintenance Lot/Accident Investigation Site

12.5" PCC Pavement with tied PCC Shoulders

4" HMA Stabilized Subbase

12" Aggregate Subgrade Improvement

Southbound 1-90/94 Mainline Lanes

17" Composite Pavement

1.75" Polymerized HMA Surface Course

2.25" Polymerized HMA Binder Course

13" PCC Base Course Widening

4" HMA Stabilized Subbase

12" Aggregate Subgrade Improvement

If you have any questions, please contact Mike Brand at (217) 782-7651.

To: Jack Elston

Attn: Michael Brand

From: Jose A. Dominguez

By: Ojas Patel

Subject: Pavement Analysis*

Date: August 7, 2019

*Route: Interstate Route 90/94

Limits: at I-290 (Circle Interchange) Section: 2015-018R & 019R

Current target: April 2020

County: Cook

Contract No.: 62A76 & 62A77 Job No.: C-91-310 & 311-15

We have completed the pavement analysis for the above captioned location. Review by the Central Office is required since the total pavement area for reconstruction exceeds 4,750 Square Yards. The following is the scope of the project:

Reconstruction to provide new I-90/94 Mainline Lanes, NB C-D Road, SB Access Road, I-90/94 at I-290 Interchange Ramps, I-90/94 at Various Streets Ramps, Accident Investigation Site, IDOT Maintenance Lot, and SB Mainline pavement widening at the south project limits.

A 20-year pavement analysis was performed on the above segments. This contract is part of an overall reconstruction of the I-90/94 at I-290 interchange. Interstate 90/94 Mainline lanes will be classified as a "Special Design" as the Traffic Factor exceeds 60 and as such, is not subject to a Life Cycle Cost Analysis. The widening of SB I-90/94 at the south project limits will match the existing pavement per BDE Figure 54-1.A as it is a short segment. In addition, per Section 54-1.06 of the BDE Manual, all ramps and the CD Road are recommended to match the mainline pavement type. It is recommended that the Accident Investigation Site and the IDOT Maintenance Lot be the same thickness as the mainline shoulders as it they are expected to serve IDOT Maintenance and Emergency Traffic Patrol vehicles. The recommended pavement design is:

I-90/94 Mainline Lanes

Reconstruction
PCC Shoulder (Tied)¹³
12 ½" Continuously Reinforced Concrete Pavement¹
4" HMA Stabilized Subbase²
12" Aggregate Subgrade Improvement^{11, 12}

M. Addis August 7, 2019 Page Two

I-90/94 at I-290 Ramps (NW/SE/SW/ES/EN/WS/WN); NB CD Road;

SB Access Road

Reconstruction
PCC Shoulder (Tied)¹³
11" PCC Pavement (Jointed)³
4" HMA Stabilized Subbase²
12" Aggregate Subgrade Improvement^{11,12}

I-90/94 Ramp at Lake St

Reconstruction
PCC Shoulder (Tied)¹³
9 1/4" PCC Pavement (Jointed)⁴
4" HMA Stabilized Subbase²
12" Aggregate Subgrade Improvement^{11,12}

I-90/94 Ramp at Randolph St/Washington/Blvd/Madison St/ Adams St/Jackson Blvd/Roosevelt Rd/

Reconstruction
PCC Shoulder (Tied)¹³
9" PCC Pavement (Jointed)⁵
4" HMA Stabilized Subbase²
12" Aggregate Subgrade Improvement^{11,12}

I-90/94 Ramp at Taylor St

Reconstruction
PCC Shoulder (Tied)¹³
9 ¾" PCC Pavement (Jointed)⁶
4" HMA Stabilized Subbase²
12" Aggregate Subgrade Improvement^{11,12}

IDOT Maintenance Lot/Accident Investigation Site

Reconstruction
PCC Shoulder (Tied)¹³
12 ½" PCC Pavement (Jointed)⁷
4" HMA Stabilized Subbase²
12" Aggregate Subgrade Improvement^{11,12}

Southbound I-90/94 Mainline Lanes

Pavement Widening

17" Composite Pavement

1 3/4" Polymerized HMA Surface Course, SMA, 9.5, Mix "F", N808

2 1/4" Polymerized HMA Binder Course, IL-19.0, N909

13" PCC Base Course Widening 10

4" HMA Stabilized Subbase²

12" Aggregate Subgrade Improvement^{11,12}

<u>¹Designer Note 1</u>: Use pay item **42100350**, **CONTINUOUSLY REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT 12** ½", paid for in square yards.

²Designer Note 2: Use pay item 31200500, STABILIZED SUBBASE – HOT MIX ASPHALT, 4", paid for in square yards.

3Designer Note 3: Use pay item 42000521, PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED), paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

*Designer Note 4: Use pay item 42000406, PORTLAND CEMENT CONCRETE PAVEMENT 9 1/4" (JOINTED), paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

<u>5Designer Note 5</u>: Use pay item **42000401, PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED),** paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

⁶Designer Note 6: Use pay item **42000416**, **PORTLAND CEMENT CONCRETE PAVEMENT 9 %"** (**JOINTED**), paid for in square yards. When variable width lanes (12'-18') exceed 14 feet in width, a centerline joint should be added to avoid longitudinal cracking; see Bureau of Design Standard 53.

<u>7Designer Note 7</u>: Use pay item 42000551, PORTLAND CEMENT CONCRETE PAVEMENT 12 ½" (JOINTED), paid for in square yards.

⁸Designer Note 8: Use pay item 40605026, POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, SMA, 9.5, MIX 'F', N80 paid for in tons.

⁹Designer Note 9: Use pay item 40603240, POLYMERIZED HMA BINDER COURSE, IL-19.0, N90 paid for in tons.

10 Designer Note 10: Use pay item 35400530, PORTLAND CEMENT CONCRETE BASE COURSE WIDENING 13" paid for in square yards.

11 Designer Note 11: Use pay item 30300112, AGGREGATE SUBGRADE IMPROVEMENT, 12", paid in square yards.

M. Addis August 7, 2019 Page Three

 $\frac{12}{2}$ Designer Note 12: Additional subgrade may be required in areas that are specified for undercut per the geotechnical report.

¹³Designer Note 13: The designer should refer to the guidelines in BDE Manual 34-2.02 for shoulder thicknesses.

If you have any questions or need additional information, please contact Ojas Patel, Pavement Design Engineer, at (847)705-4550.

Jose A. Dominguez, P.E. Project Support Engineer

SCOPE OF WORK for Circle Interchange (I-90/94 and I-290/Congress Parkway)

CONTRACT 62A76 NB I-90/94

Section 2015-019R Job Number C-91-310-15 PTB 163-001

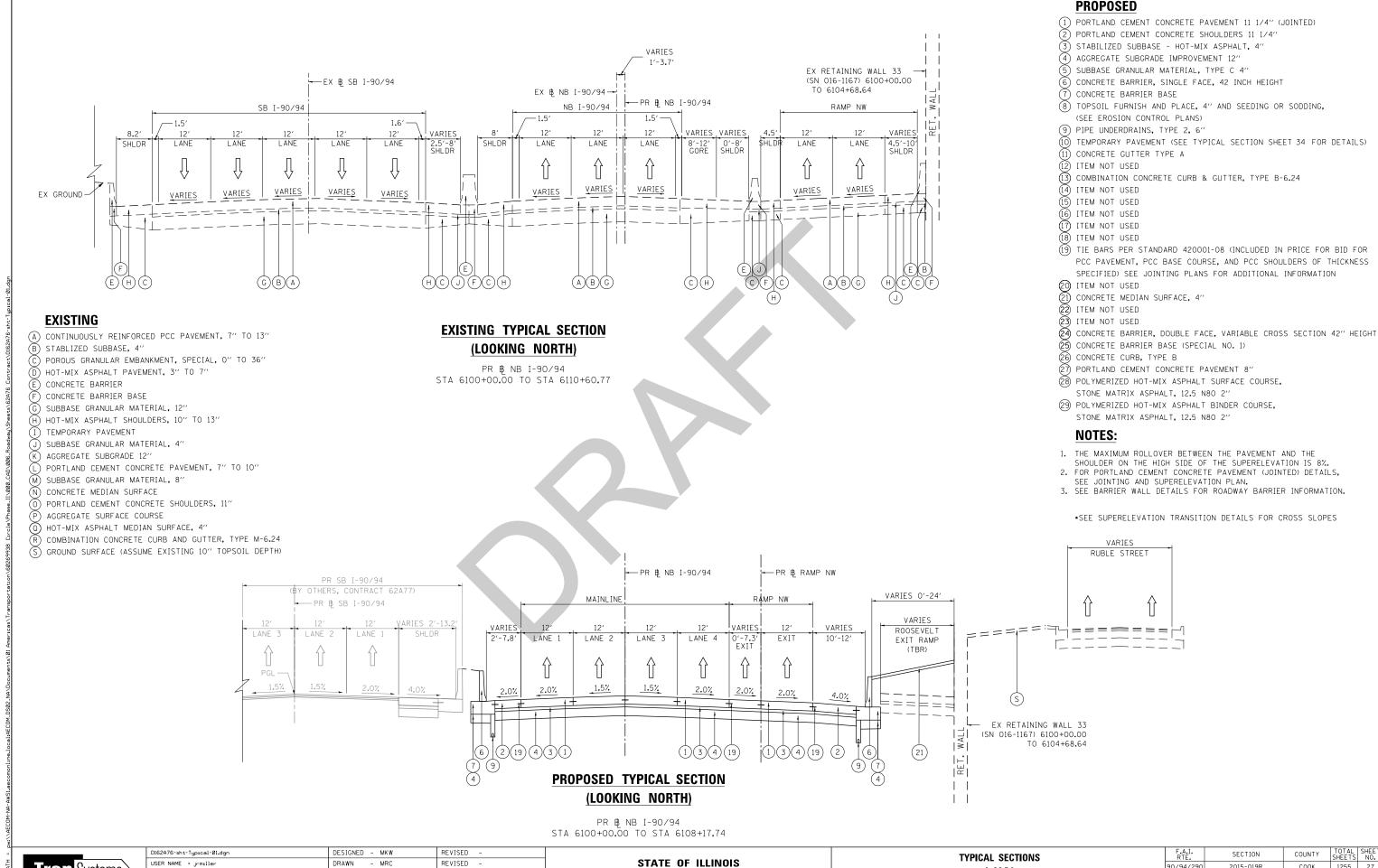
June 21, 2019

This improvement consists of the reconstruction of Northbound I-90/94 from Roosevelt Road to Madison Street and resurfacing of Northbound I-90/94 from Madison Street to Lake Street. The limits of work on Northbound I-90/94 are estimated to be from south of Roosevelt Road to north of Lake Street. The estimated length of improvement is approximately 7,508'. The work also includes retaining wall construction, drainage, underpass, and City street lighting, signing, traffic control and protection, landscaping, urban enhancements and pavement markings.

Permanent roadway and shoulder pavement will be constructed along Northbound I-90/94, Roosevelt Street Entrance Ramp, Taylor Street Entrance Ramp, the Northbound Collector-Distributor (C-D) Road, Jackson Boulevard Entrance Ramp, Adams Street Entrance Ramp, Madison Street Exit Ramp, Washington Boulevard Exit Ramp, Lake Street Exit Ramp, Randolph Street Exit Ramp, Ramp WN, Ramp EN, and Ramp EN Slip Ramp. In addition, an IDOT maintenance parking lot is proposed under I-290 east of NB I-90/94. Temporary pavement will be constructed along NB I-90/94 and some of the ramps for maintenance of traffic purposes. The temporary pavement will be installed in the Pre-Stage, Stage 1 and Stage 3 and will be removed after approximately 2 years.



PROJECT LOCATION MAP CONTRACT 62A76 NB I-90/94 SECTION 2015-019R C-91-310-15 NOT TO SCALE



DEPARTMENT OF TRANSPORTATION

90/94/290

TO STA.

⊢90/94

OF 17 SHEETS STA.

SCALE: NONE

SHEET 1

2015-019R

COOK

1255 27

CONTRACT NO. 62A76

Tran Systems

USER NAME = jrmiller

PLOT DATE = 6/18/2019

DRAWN

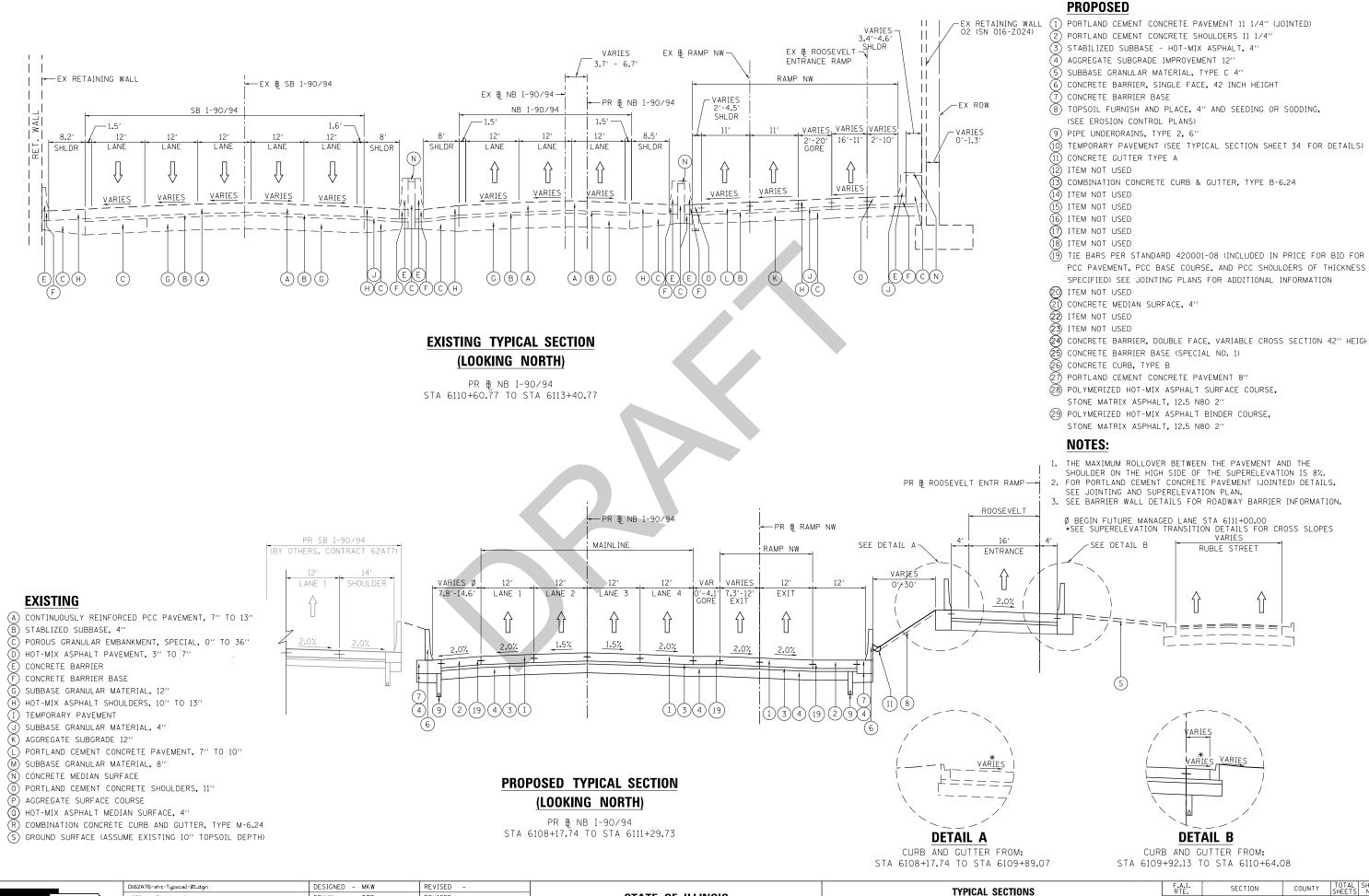
CHECKED

- MRC

REVISED

REVISED

REVISED



Tran Systems

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

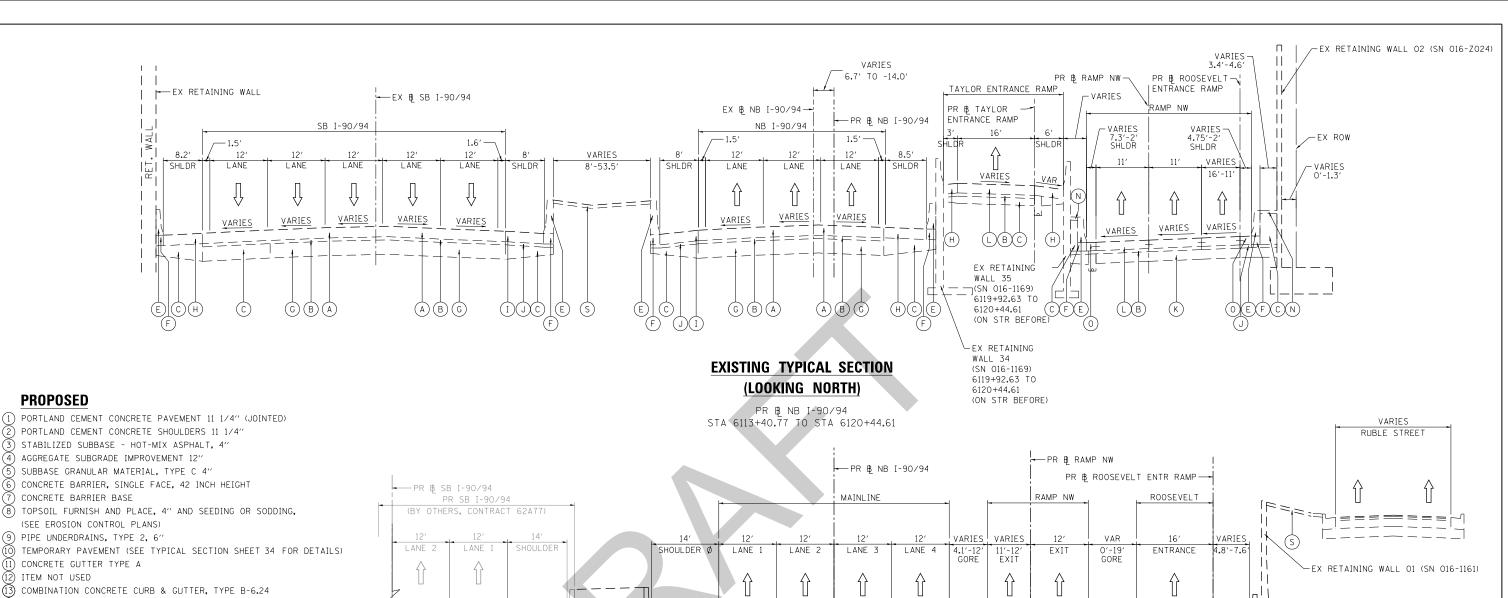
-90°94

SCALE: NONE SHEET 2 OF 17 SHEETS STA.

F.A.I. SECTION COUNTY TOTAL SHEETS NO.

90/94/290 2015-019R COOK 1255 28

CONTRACT NO. 62A76



PROPOSED

- (14) ITEM NOT USED
- (15) ITEM NOT USED
- (16) ITEM NOT USED
- ITEM NOT USED
- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- (20) ITEM NOT USED
- (21) CONCRETE MEDIAN SURFACE, 4"
- (22) ITEM NOT USED
- (23) ITEM NOT USED
- (2) ITEM NOT USED
 (C) POROUS GRANULAR EMBANKMENT, SPECIA
 (C) POROUS GRANULAR EMBANKMENT, SPECIA
 (C) POROUS GRANULAR EMBANKMENT, SPECIA
 (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- 25 CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (26) CONCRETE CURB, TYPE B
 - PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- 29 POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.
- *SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES \emptyset BEGIN FUTURE MANAGED LANE STA 6111+00.00

EXISTING (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13'

- B) STABLIZED SUBBASE, 4"
- POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 36"
- (E) CONCRETE BARRIER
- F) CONCRETE BARRIER BASE
- (G) SUBBASE GRANULAR MATERIAL, 12"
- H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- (I) TEMPORARY PAVEMENT
-) SUBBASE GRANULAR MATERIAL, 4"
- (K) AGGREGATE SUBGRADE 12"
- PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- (0) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (0) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- R COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEP

PROPOSED TYPICAL SECTION (LOOKING NORTH)

1.5%

2.0%

<u>VARIES</u>

2.0%

2.0%

(1)(3)(4)(19)

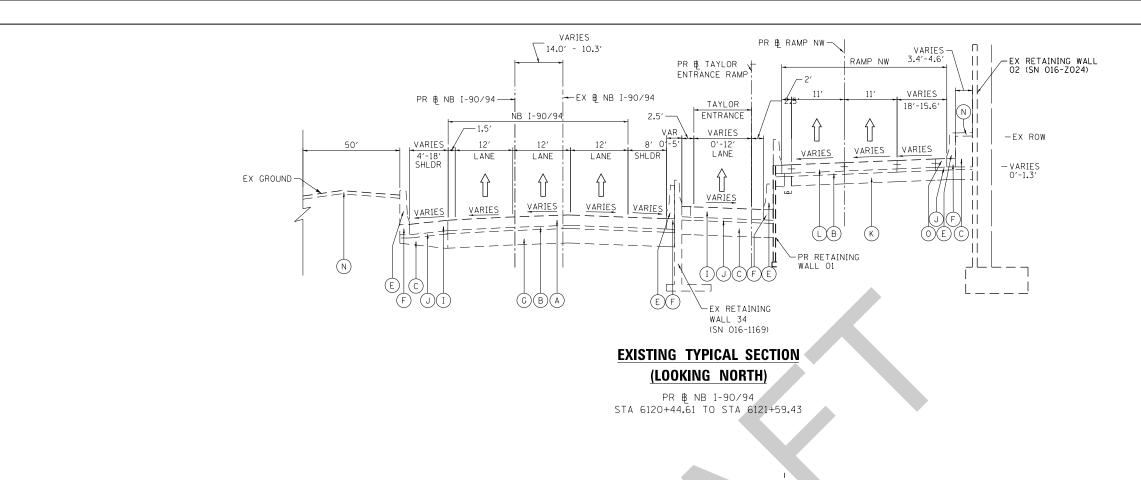
PR B NB I-90/94 STA 6111+29.73 TO STA STA 6114+64.26

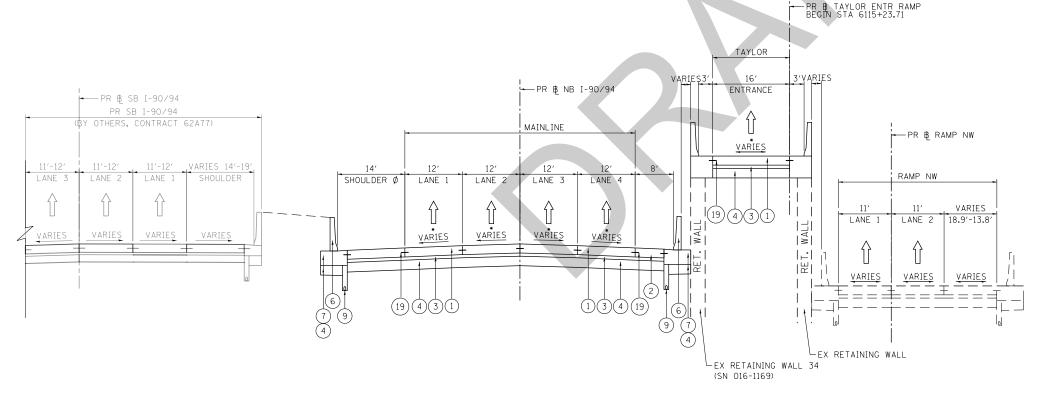
	D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -
Cyctomo	USER NAME = jrmiller	DRAWN - TTP	REVISED -
an Systems >	PLOT SCALE = 20.0000 '/ in.	CHECKED - JMG	REVISED -
	PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

2.0%

			TYPICA	L SECT	IONS		F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
							90/94/290	2015-019R	COOK	1255	29
							·		CONTRACT	NO. 6	52A76
	SCALE: NONE	SHEET 3	OF 17	SHEETS	STA.	TO STA.		ILLINOIS FED. AI	D PROJECT		





PROPOSED TYPICAL SECTION (LOOKING NORTH)

PR & NB I-90/94 STA 6114+64.26 TO STA 6119+92.46

EXISTING

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- (B) STABLIZED SUBBASE, 4"
- (C) POROUS GRANULAR EMBANKMENT, SPECIAL, O" TO 36"
- (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- (E) CONCRETE BARRIER
- F) CONCRETE BARRIER BASE
- (G) SUBBASE GRANULAR MATERIAL, 12"
- (H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- I TEMPORARY PAVEMENT
- J SUBBASE GRANULAR MATERIAL, 4"
- (K) AGGREGATE SUBGRADE 12"
- (L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- (0) PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (1) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- (R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- SUBBASE GRANULAR MATERIAL, TYPE C 4"
- 6 CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- CONCRETE BARRIER BASE
- 8 TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING,
- (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- (10) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- (11) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
 (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24

- (14) ITEM NOT USED (15) ITEM NOT USED (16) ITEM NOT USED (17) ITEM NOT USED
- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- 20 ITEM NOT USED 21 CONCRETE MEDIA CONCRETE MEDIAN SURFACE, 4"
- 22 ITEM NOT USED 23 ITEM NOT USED
- 24 CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (26) CONCRETE CURB, TYPE B
- 7 PORTLAND CEMENT CONCRETE PAVEMENT 8"
- 28 POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- (29) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

Ø BEGIN FUTURE MANAGED LANE STA 6111+00.00 •SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

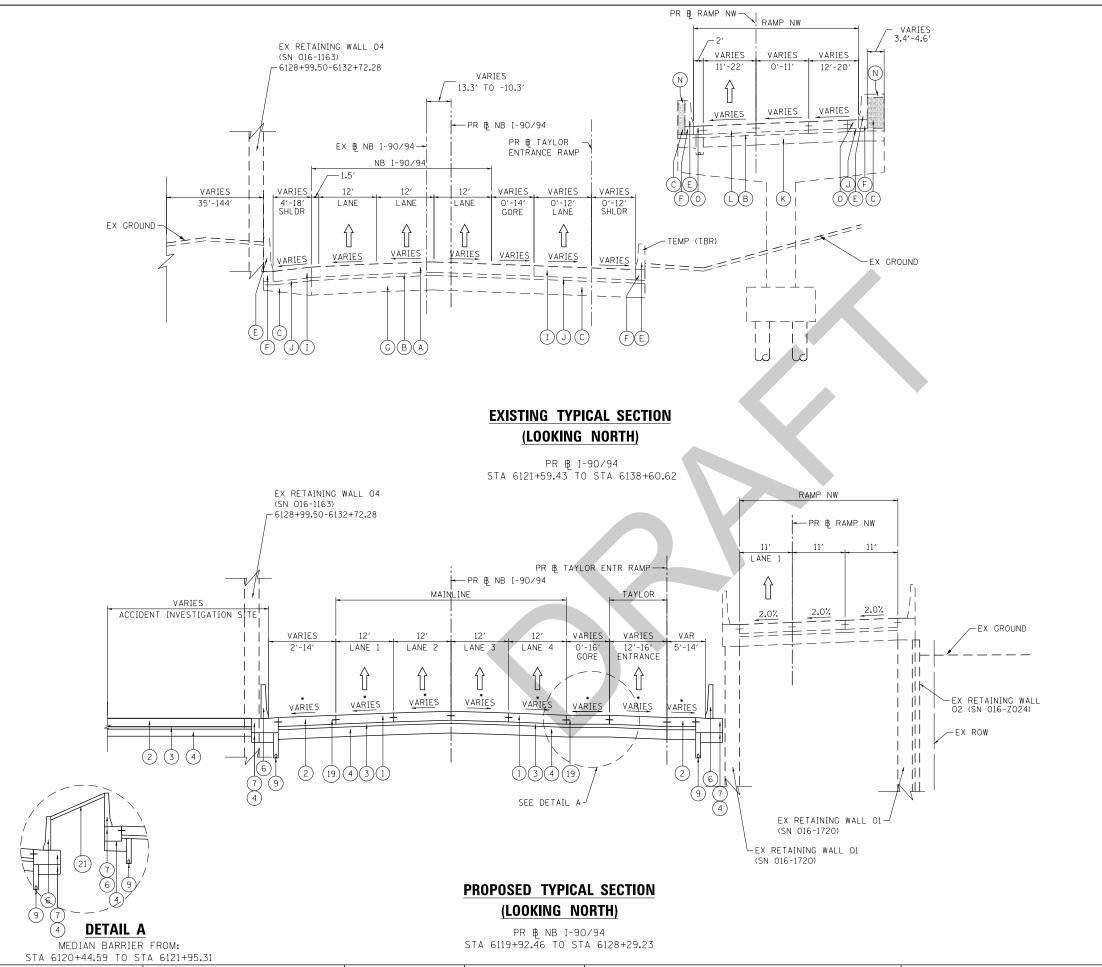


D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -
USER NAME = jrmiller	DRAWN - TTP	REVISED -
PLOT SCALE = 20.0000 '/ in.	CHECKED - JMG	REVISED -
PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

TYPICAL SECTIONS						F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHE
⊢90⁄94					90/94/290	2015-019R	COOK	1255	3	
		ļ.						CONTRACT	NO. 6	52A7
NONE	SHEET 4	OF 17	SHEETS	STA.	TO STA.		ILLINOIS FED. A	ID PROJECT		

SCALE: NO



EXISTING

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
 - B STABLIZED SUBBASE, 4"
- C) POROUS GRANULAR EMBANKMENT, SPECIAL, O" TO 36"
- D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- (E) CONCRETE BARRIER
- (F) CONCRETE BARRIER BASE
- G) SUBBASE GRANULAR MATERIAL, 12"
- (H) HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- I) TEMPORARY PAVEMENT
- (J) SUBBASE GRANULAR MATERIAL, 4"
- K) AGGREGATE SUBGRADE 12"
- L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- M) SUBBASE GRANULAR MATERIAL, 8"
- (N) CONCRETE MEDIAN SURFACE
- O PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- (P) AGGREGATE SURFACE COURSE
- (0) HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- (R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

PROPOSED

- (1) PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
- (3) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (5) SUBBASE GRANULAR MATERIAL, TYPE C 4"
- 6 CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- (7) CONCRETE BARRIER BASE
- (8) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING,
- (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- (11) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
- (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- (14) ITEM NOT USED
- (15) ITEM NOT USED
- (16) ITEM NOT USED
- (17) ITEM NOT USED
- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- (20) ITEM NOT USED
- (21) CONCRETE MEDIAN SURFACE, 4"
- (22) ITEM NOT USED
- (23) ITEM NOT USED
- (24) CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (26) CONCRETE CURB, TYPE B
- PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE,
- STONE MATRIX ASPHALT, 12.5 N80 2"
- (29) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

- THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
 FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS,
- SEE JOINTING AND SUPERELEVATION PLAN.

 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

*SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

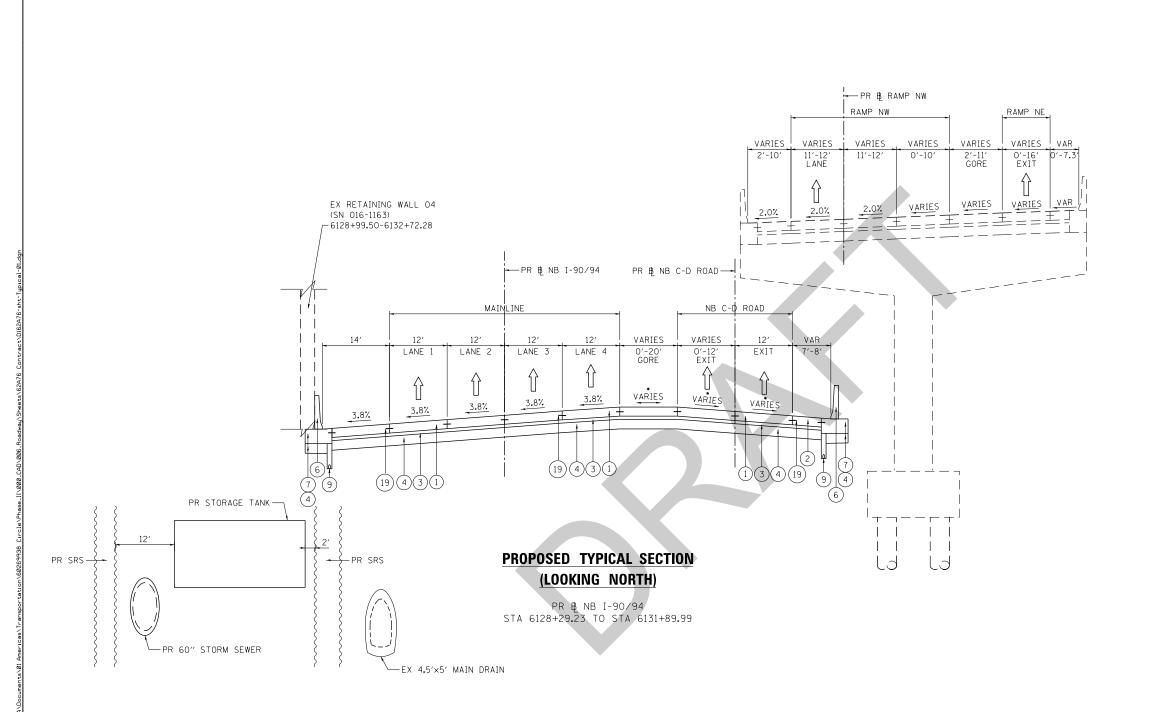


D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -
USER NAME = jrmiller	DRAWN - TTP	REVISED -
PLOT SCALE = 20.0000 ' / in.	CHECKED - JMG	REVISED -
PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

		TY		AL SECT 1-90/94	IONS
SCALE: NONE	SHEET 5	OF	17	SHEETS	STA.

90/94/290 2015-019R COOK 1255 CONTRACT NO. 62A76



PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- 2) PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4"
 3) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (5) SUBBASE GRANULAR MATERIAL, TYPE C 4"
- (6) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- (7) CONCRETE BARRIER BASE
- (8) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- (1) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
- (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
- (14) ITEM NOT USED
- (15) ITEM NOT USED
- 16 ITEM NOT USED
- (17) ITEM NOT USED
- (18) ITEM NOT USED
- 19 TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS

SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION

- ② ITEM NOT USED
- (21) CONCRETE MEDIAN SURFACE, 4"
- (2) ITEM NOT USED (23) ITEM NOT USED
- (4) CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
 (26) CONCRETE CURB, TYPE B
- (27) PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- (29) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE
- SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.
- *SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

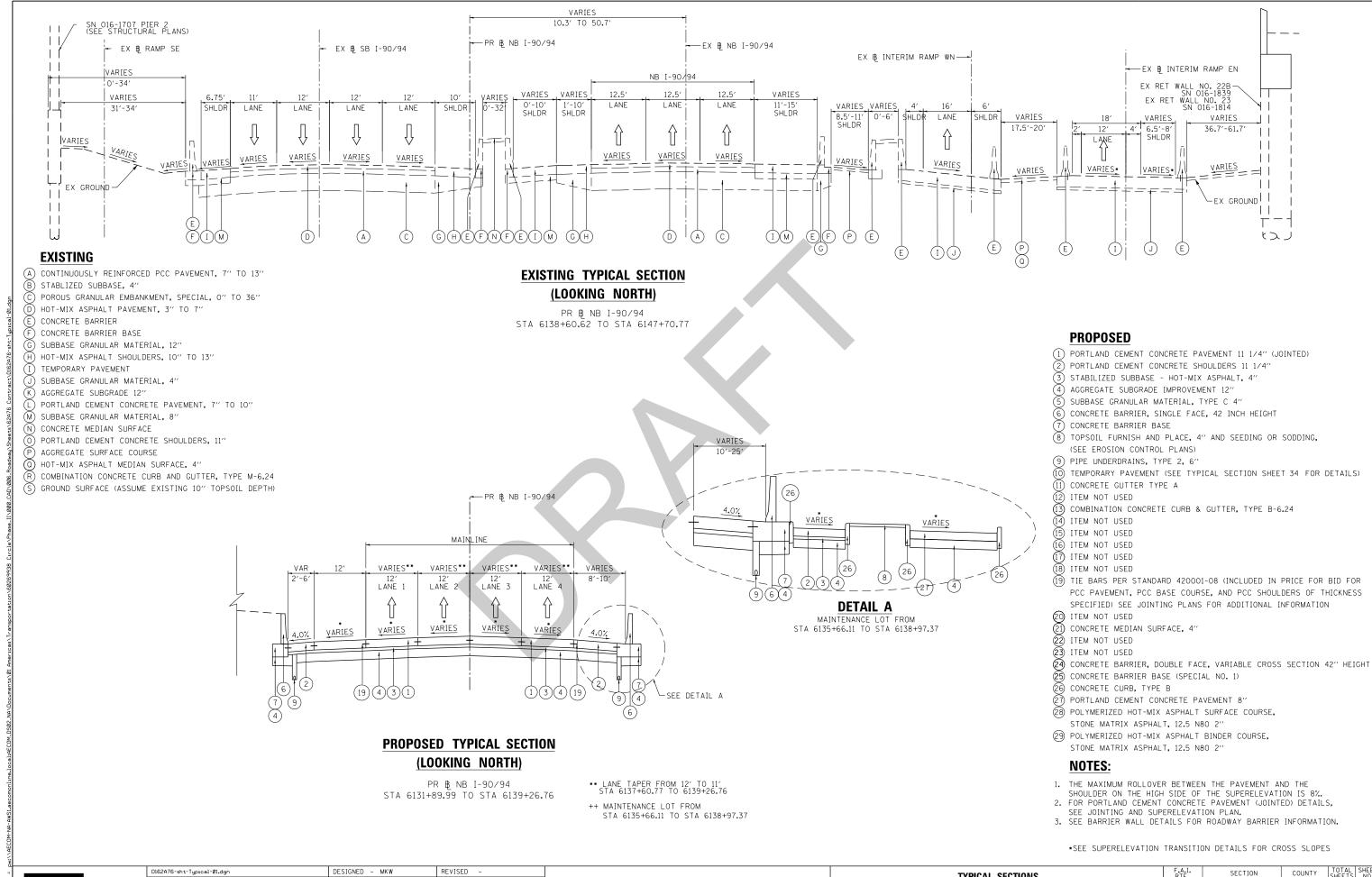
	1 Systems >
-	,

D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -
USER NAME = jrmiller	DRAWN - TTP	REVISED -
PLOT SCALE = 20.0000 '/ in.	CHECKED - JMG	REVISED -
PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

SCALE: NONE

	TYPICAL SECTIONS				F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
⊢ 90∕94				90/94/290	2015-019R	COOK	1255	32		
F3U34							CONTRACT	NO. 6	2A76	
	SHEET 6	OF 17	SHEETS	STA.	TO STA.		ILL INOIS FED. AT	D PROJECT		



Tran Systems

USER NAME = jrmiller DRAWN - TTP REVISED CHECKED REVISED DATE REVISED PLOT DATE = 6/18/2019 - 6/21/19

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION** TYPICAL SECTIONS 90/94/290 2015-019R COOK

1255 33 **⊢**90/94 CONTRACT NO. 62A76 SCALE: NONE SHEET 7 OF 17 SHEETS STA. TO STA.

PROPOSED 1) PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED) 2 PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4" 3 STABILIZED SUBBASE - HOT-MIX ASPHALT, 4" (4) AGGREGATE SUBGRADE IMPROVEMENT 12" (5) SUBBASE GRANULAR MATERIAL, TYPE C 4" (6) CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (7) CONCRETE BARRIER BASE (8) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS) (9) PIPE UNDERDRAINS, TYPE 2, 6" 10 TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS) (11) CONCRETE GUTTER TYPE A (12) ITEM NOT USED (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24 (14) ITEM NOT USED (15) ITEM NOT USED (16) ITEM NOT USED (17) ITEM NOT USED (18) ITEM NOT USED (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION (20) ITEM NOT USED (21) CONCRETE MEDIAN SURFACE, 4" (22) ITEM NOT USED (23) ITEM NOT USED CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT 25 CONCRETE BARRIER BASE (SPECIAL NO. 1) © CONCRETE CURB, TYPE B (27) PORTLAND CEMENT CONCRETE PAVEMENT 8" (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2" 29 POLYMERIZED HOT-MIX ASPHALT BINDER COURSE,

STONE MATRIX ASPHALT, 12.5 N80 2"

SEE JOINTING AND SUPERELEVATION PLAN.

 THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
 FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS,

90/94/290

TO STA.

2015-019R

3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.

COUNTY

COOK 1255 35

CONTRACT NO. 62A76

NOTES:

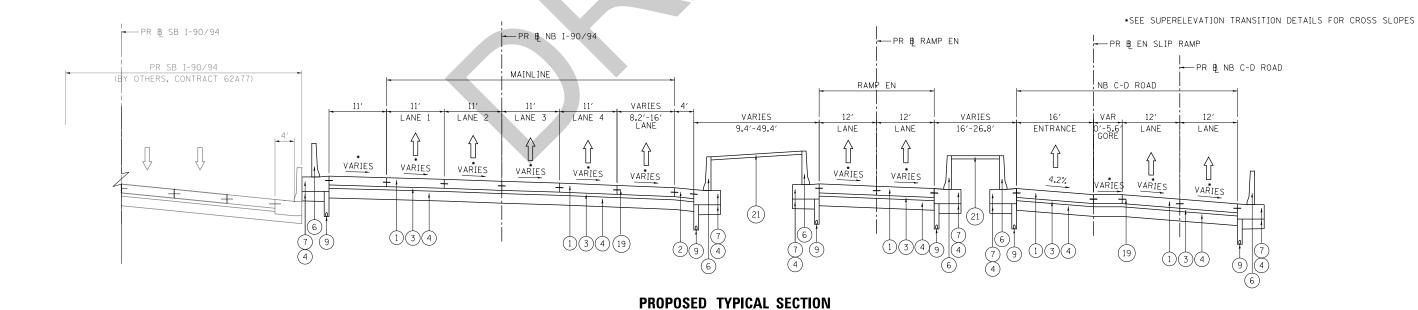
TYPICAL SECTIONS

⊢90⁄94

OF 17 SHEETS STA.

SCALE: NONE

SHEET 9



REVISED -

REVISED -

REVISED

REVISED

DESIGNED - MKW

DRAWN - TTP

CHECKED - JMG

- 6/21/19

DATE

D162A76-sht-Typical-01.dgn

PLOT SCALE = 20.0000 '/ in.

USER NAME = jrmiller

PLOT DATE = 6/18/2019

Tran Systems

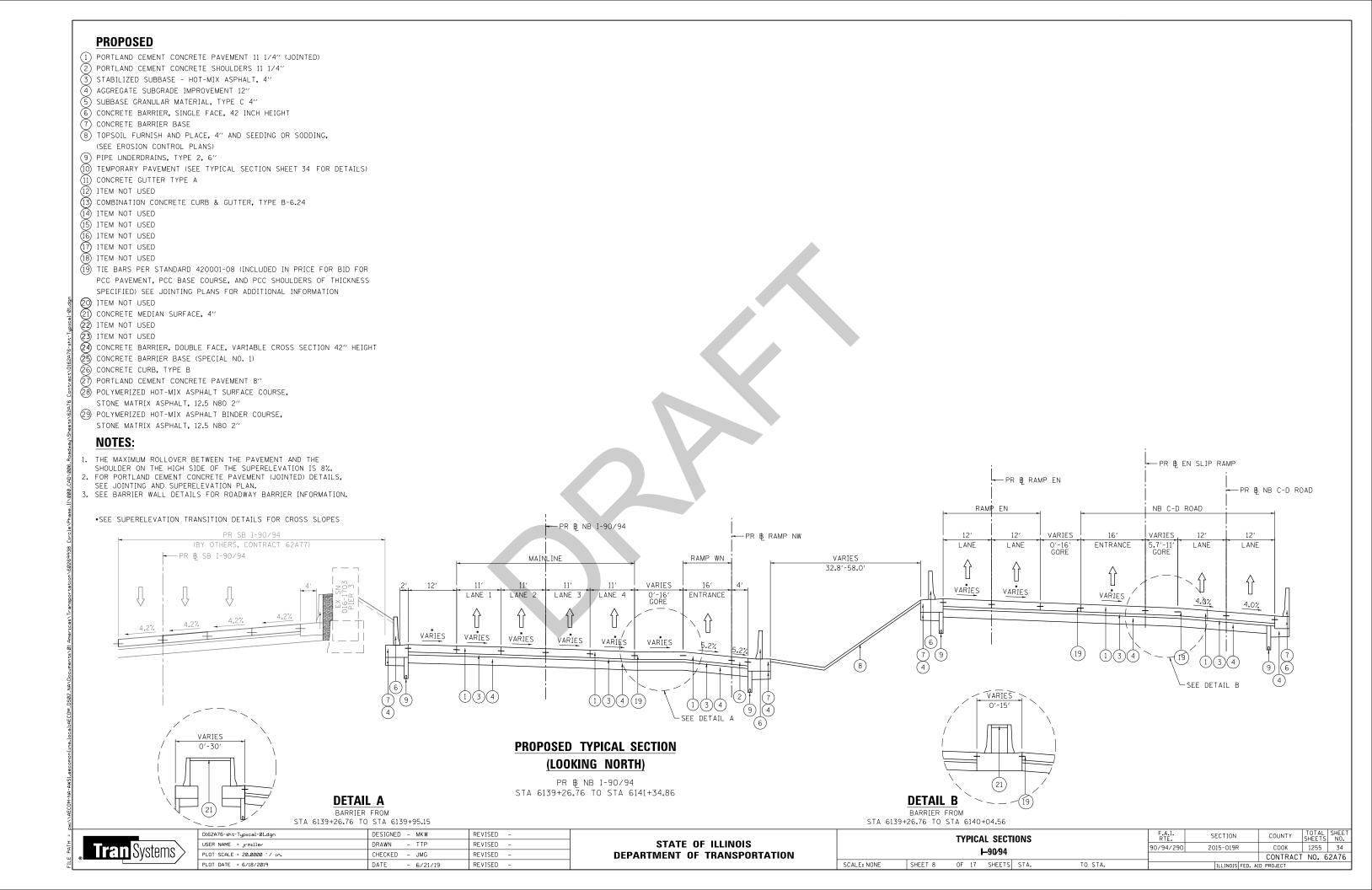
(LOOKING NORTH)

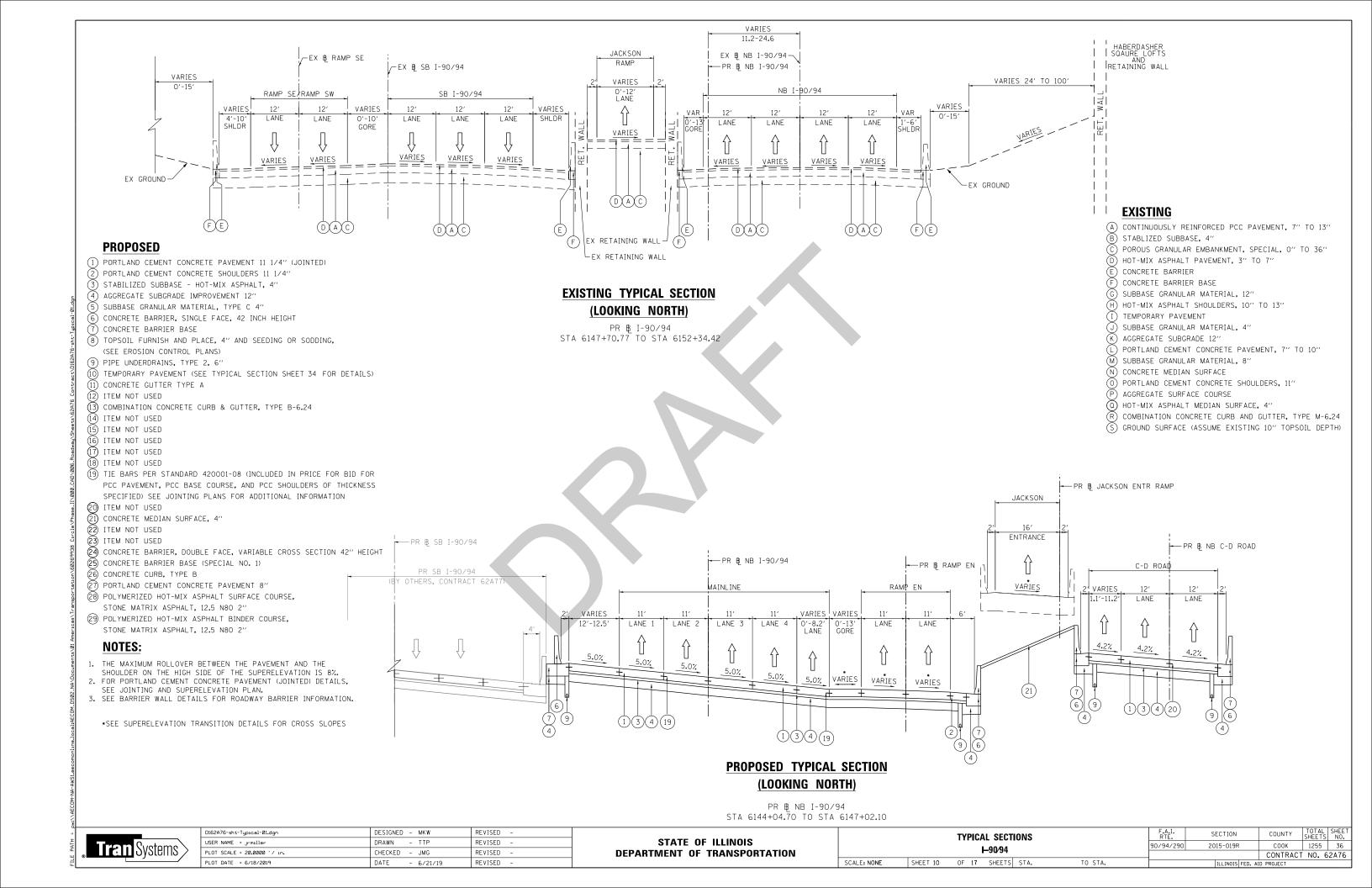
PR ₱ NB I-90/94

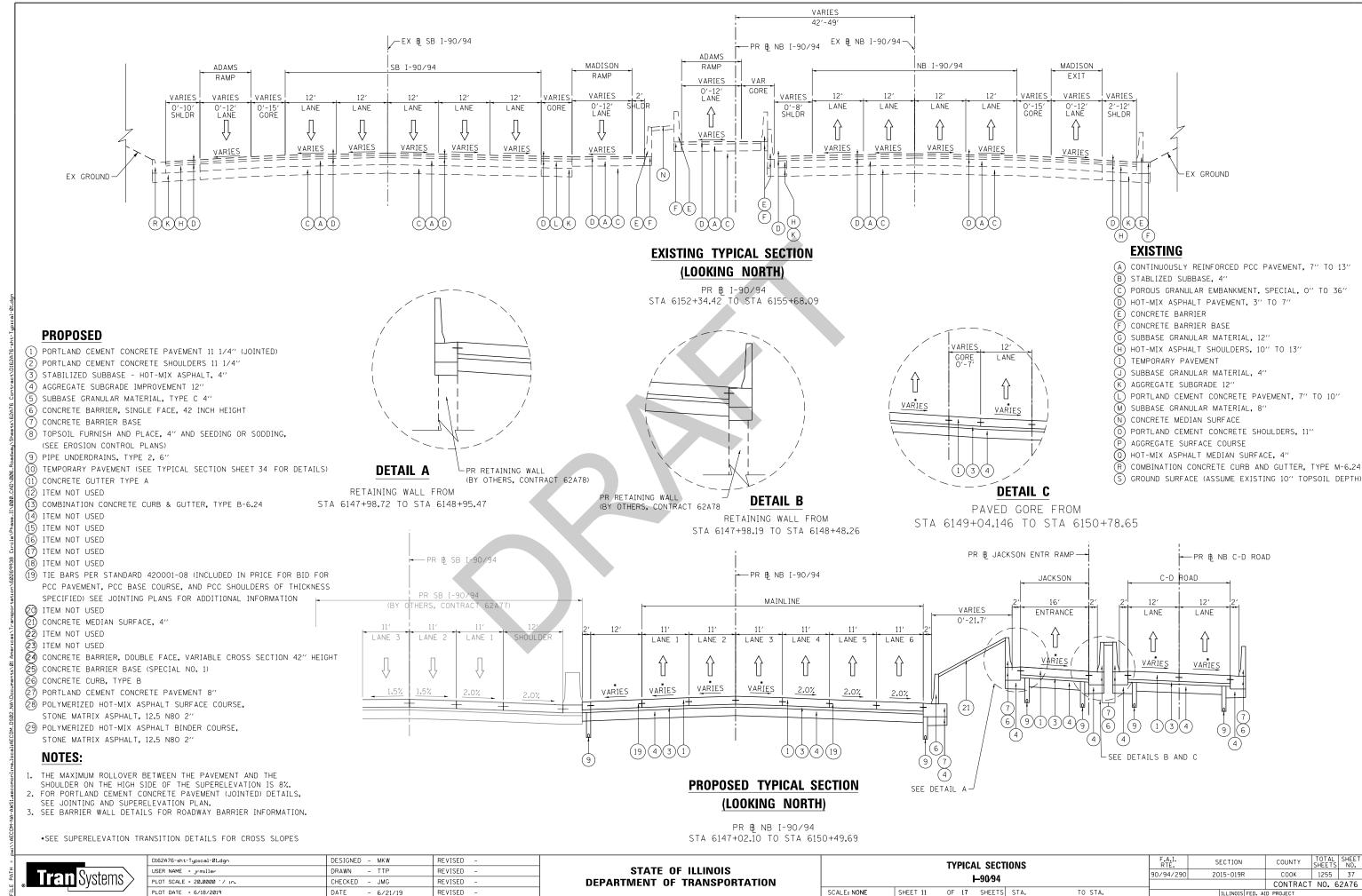
STA 6141+34.86 TO STA 6144+04.70

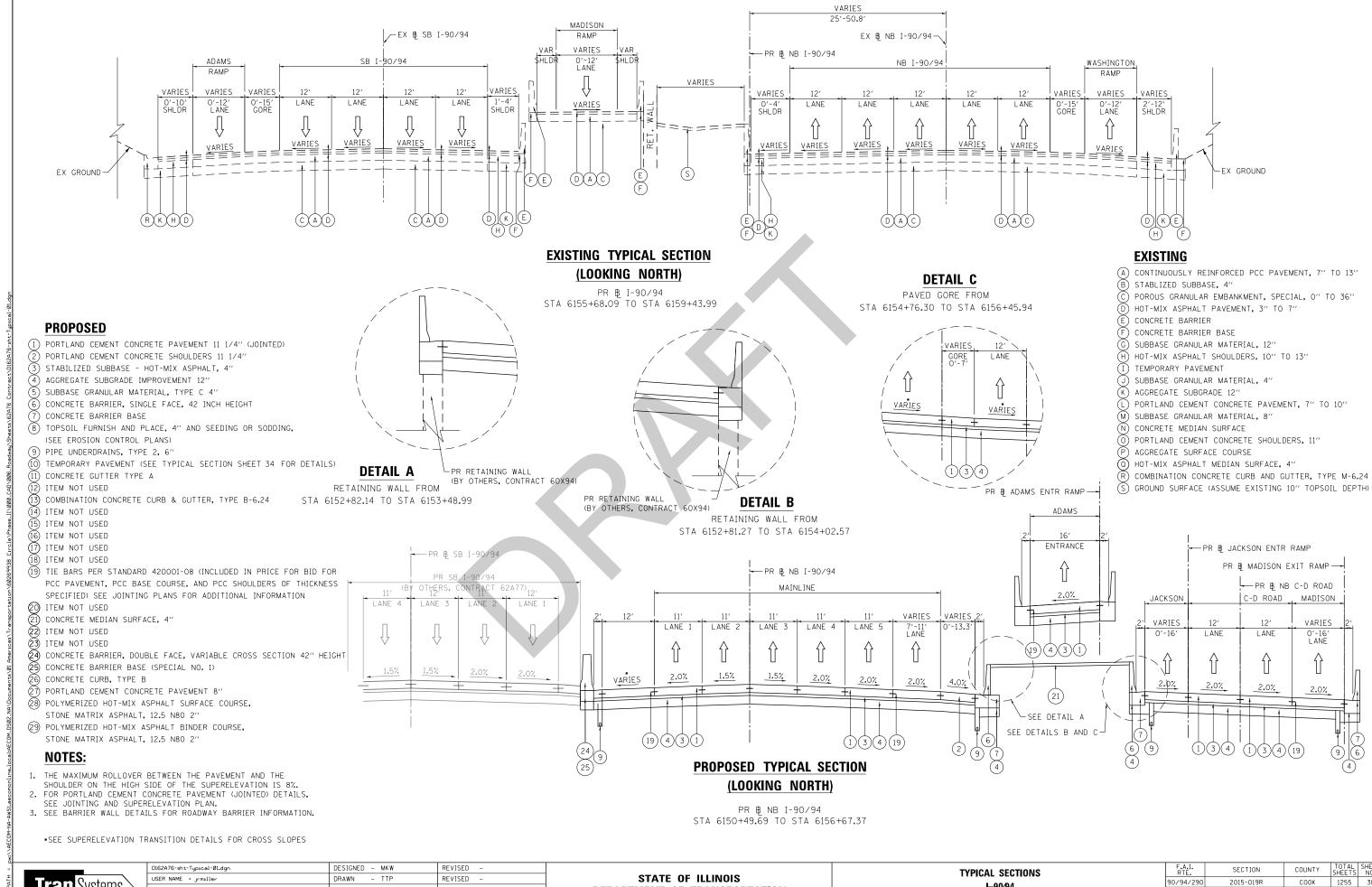
STATE OF ILLINOIS

DEPARTMENT OF TRANSPORTATION







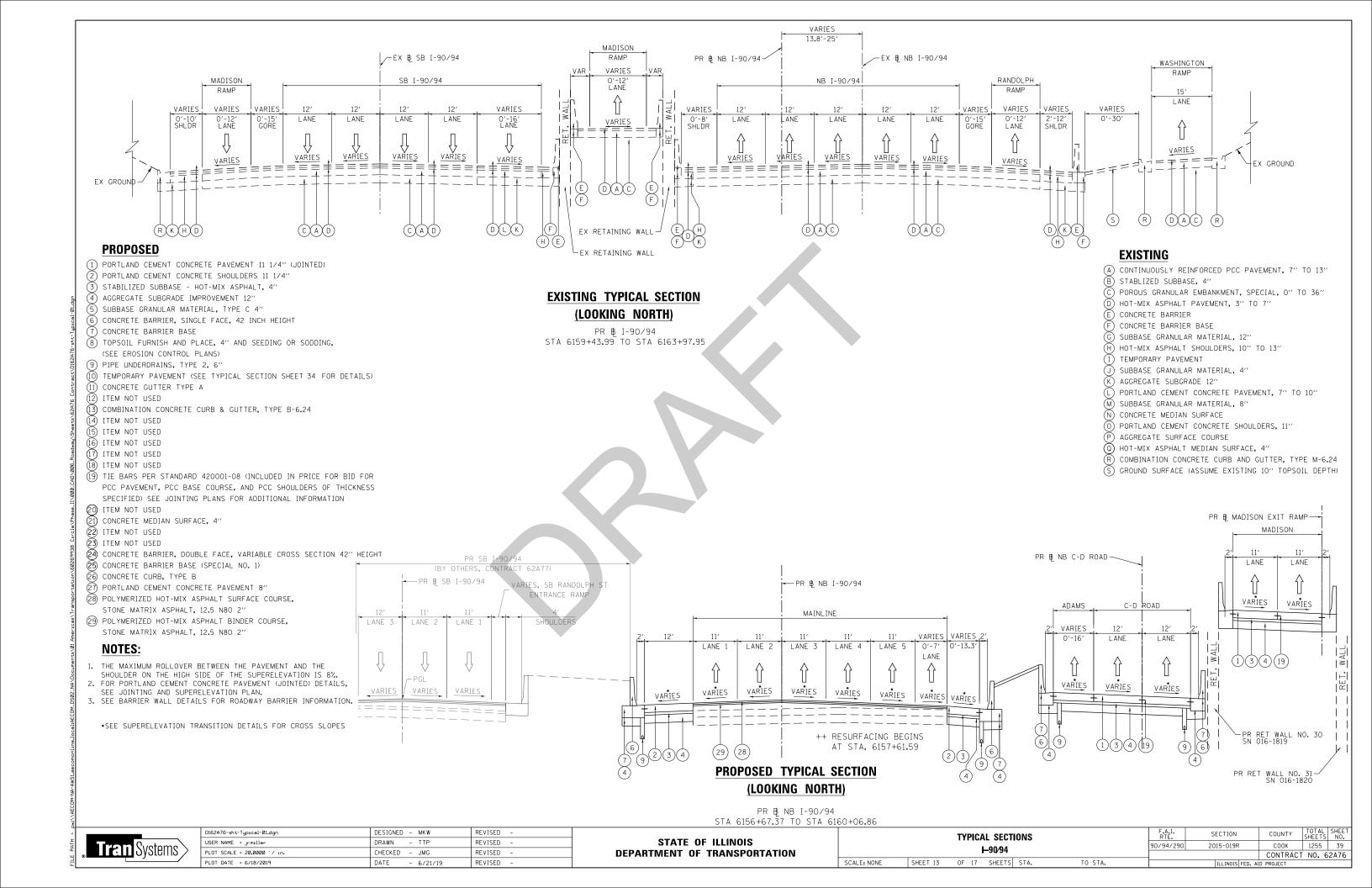


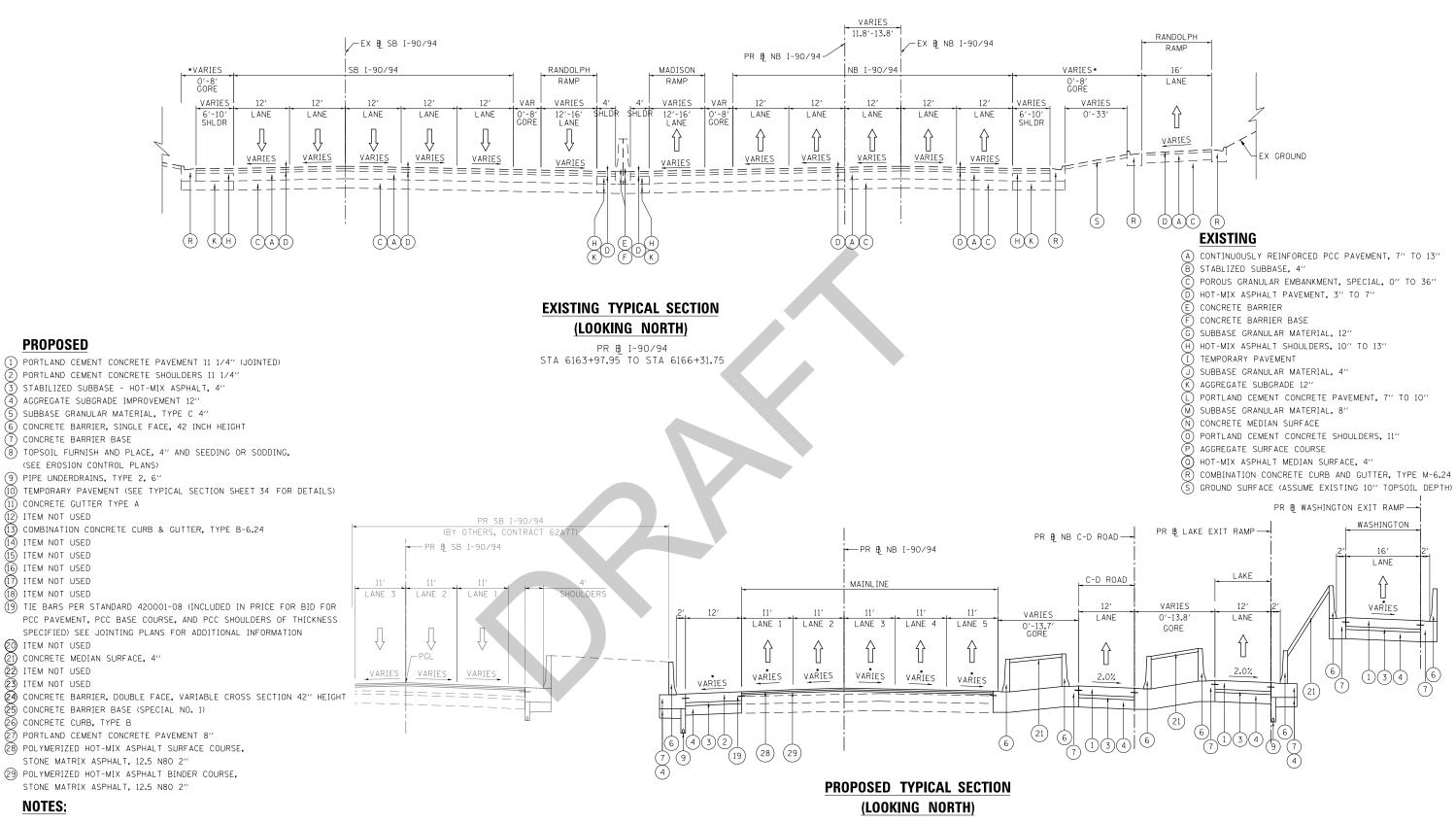
Tran Systems

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SCALE: NO

TYPICAL SECTIONS ⊢90⁄94					RTE.	SECTION	COUNTY	SHEETS	NO.	
					90/94/290	2015-019R	COOK	1255	38	
F3V34							CONTRACT	NO. 6	52A76	
IONE	SHEET 12	OF 17	SHEETS ST	A. TO STA.			ILLINOIS FE	D. AID PROJECT		





PROPOSED

(12) ITEM NOT USED

14 ITEM NOT USED

(15) ITEM NOT USED (16) ITEM NOT USED (17) ITEM NOT USED (18) ITEM NOT USED

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS,
- SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.
- *SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

DESIGNED - MKW REVISED D162A76-sht-Typical-01.dgn USER NAME = jrmiller DRAWN - TTP REVISED CHECKED REVISED REVISED

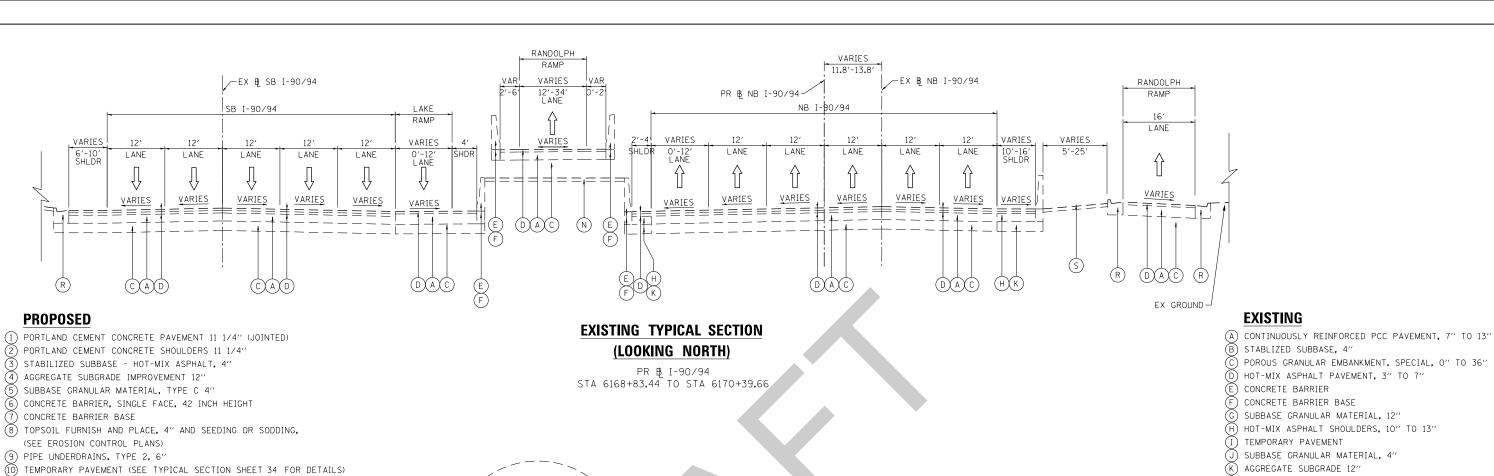
STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION** PR B NB I-90/94

STA 6160+06.86 TO STA 6164+05.78

SCALE: NONE

TYPICAL SECTIONS 90/94/290 2015-019R COOK 1255 40 **⊢**90/94 CONTRACT NO. 62A76 SHEET 14 OF 17 SHEETS STA.

Tran Systems



SHLDF 7.8'-0' 43192928

DETAIL A FULL DEPTH PAVEMENT FROM STA 6168+79.46 TO STA 6170+90.31

SEE DETAIL

PR & RANDOLPH EXIT RAMP -PR & LAKE EXIT RAMP RANDOLPH -PR & NB I-90/94 --- PR B NB C-D ROAD LAKE VARIES 0'-16 LANE VARIES MAINLINE 13.8′-34.0 LANE VARIES 2.0% LANE 1 LANE 2 LANE 3 LANE 4 LANE 5 8′-12 LANE 2.0% (21) 2.0% PROPOSED TYPICAL SECTION

(L) PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"

(R) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24

(S) GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)

(O) PORTLAND CEMENT CONCRETE SHOULDERS, 11"

(0) HOT-MIX ASPHALT MEDIAN SURFACE, 4"

(M) SUBBASE GRANULAR MATERIAL, 8"

(N) CONCRETE MEDIAN SURFACE

(P) AGGREGATE SURFACE COURSE

PR B NB I-90/94 STA 6164+05.78 TO STA 6170+41.66

(LOOKING NORTH)

(11) CONCRETE GUTTER TYPE A

20 ITEM NOT USED
21 CONCRETE MEDIAN SURFACE, 4"
22 ITEM NOT USED
23 ITEM NOT USED

(13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24

(19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION

CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
CONCRETE BARRIER BASE (SPECIAL NO. 1)
CONCRETE CURB, TYPE B

(12) ITEM NOT USED

(14) ITEM NOT USED

(15) ITEM NOT USED

(16) ITEM NOT USED

(17) ITEM NOT USED

(18) ITEM NOT USED

- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%.
- 2. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS,
- SEE JOINTING AND SUPERELEVATION PLAN.

(27) PORTLAND CEMENT CONCRETE PAVEMENT 8"

STONE MATRIX ASPHALT, 12.5 N80 2"

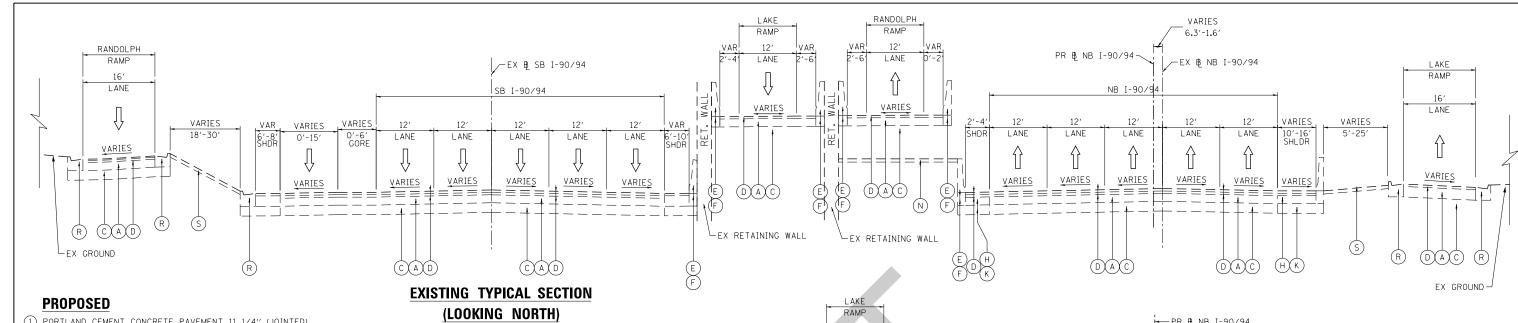
(28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE,

29 POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"

- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.
- *SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES



DI62A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -			TYPIC	CAL SECTIONS		F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEET SHEETS NO.
USER NAME = jrmiller	DRAWN - TTP	REVISED -	STATE OF ILLINOIS			1 00/0/		90/94/290	2015-019R	СООК	1255 41
PLOT SCALE = 20.0000 '/ in.	CHECKED - JMG	REVISED -	DEPARTMENT OF TRANSPORTATION			⊢ 90⁄94				CONTRACT	
PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -		SCALE: NONE	SHEET 15 OF 17	SHEETS STA.	TO STA.		ILLINOIS FED. AI	D PROJECT	



- 1) PORTLAND CEMENT CONCRETE PAVEMENT 11 1/4" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE SHOULDERS 11 1/4" STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"
- (4) AGGREGATE SUBGRADE IMPROVEMENT 12"
- SUBBASE GRANULAR MATERIAL, TYPE C 4"
- 6 CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT
- CONCRETE BARRIER BASE
- 8 TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING, (SEE EROSION CONTROL PLANS)
- (9) PIPE UNDERDRAINS, TYPE 2, 6"
- (10) TEMPORARY PAVEMENT (SEE TYPICAL SECTION SHEET 34 FOR DETAILS)
- (11) CONCRETE GUTTER TYPE A
- (12) ITEM NOT USED
 (13) COMBINATION CONCRETE CURB & GUTTER, TYPE B-6.24
 (14) ITEM NOT USED
 (15) ITEM NOT USED
 (16) ITEM NOT USED
 (17) ITEM NOT USED
 (18) ITEM NOT USED

- (18) ITEM NOT USED
- (19) TIE BARS PER STANDARD 420001-08 (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT, PCC BASE COURSE, AND PCC SHOULDERS OF THICKNESS SPECIFIED) SEE JOINTING PLANS FOR ADDITIONAL INFORMATION
- (2) ITEM NOT USED
 (21) CONCRETE MEDIAN SURFACE, 4"
 (22) ITEM NOT USED
- 23) ITEM NOT USED
- 24 CONCRETE BARRIER, DOUBLE FACE, VARIABLE CROSS SECTION 42" HEIGHT
- (25) CONCRETE BARRIER BASE (SPECIAL NO. 1)
- (6) CONCRETE CURB, TYPE B
- PORTLAND CEMENT CONCRETE PAVEMENT 8"
- (28) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5 N80 2"
- 29 POLYMERIZED HOT-MIX ASPHALT BINDER COURSE. STONE MATRIX ASPHALT, 12.5 N80 2"

NOTES:

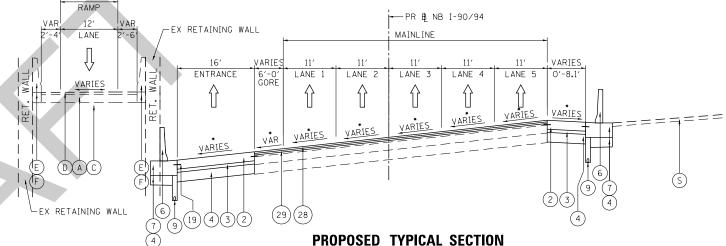
- 1. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE
- SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8%. FOR PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED) DETAILS, SEE JOINTING AND SUPERELEVATION PLAN.
- 3. SEE BARRIER WALL DETAILS FOR ROADWAY BARRIER INFORMATION.
 - *SEE SUPERELEVATION TRANSITION DETAILS FOR CROSS SLOPES

PR B I-90/94

STA 6170+39.66 TO STA 6175+07.63

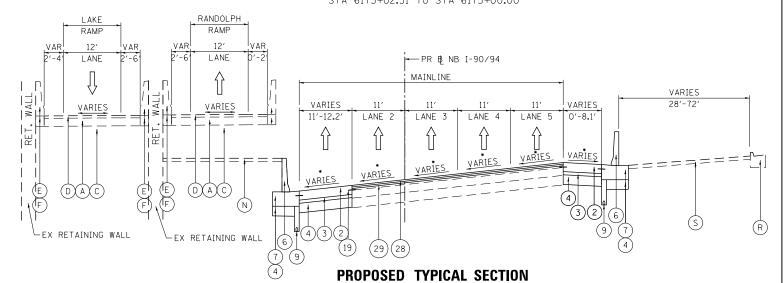
EXISTING

- (A) CONTINUOUSLY REINFORCED PCC PAVEMENT, 7" TO 13"
- STABLIZED SUBBASE, 4"
- POROUS GRANULAR EMBANKMENT, SPECIAL, O" TO 36'
- (D) HOT-MIX ASPHALT PAVEMENT, 3" TO 7"
- CONCRETE BARRIER
- CONCRETE BARRIER BASE
- SUBBASE GRANULAR MATERIAL, 12"
- HOT-MIX ASPHALT SHOULDERS, 10" TO 13"
- TEMPORARY PAVEMENT
- SUBBASE GRANULAR MATERIAL, 4"
- AGGREGATE SUBGRADE 12"
- PORTLAND CEMENT CONCRETE PAVEMENT, 7" TO 10"
- SUBBASE GRANULAR MATERIAL, 8"
- CONCRETE MEDIAN SURFACE
- PORTLAND CEMENT CONCRETE SHOULDERS, 11"
- AGGREGATE SURFACE COURSE
- O HOT-MIX ASPHALT MEDIAN SURFACE, 4"
- COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- GROUND SURFACE (ASSUME EXISTING 10" TOPSOIL DEPTH)



(LOOKING NORTH)

PR B NB I-90/94 STA 6173+02.31 TO STA 6175+00.00



(LOOKING NORTH) PR B NB I-90/94 STA 6170+41.66 TO STA 6173+02.31



D162A76-sht-Typical-01.dgn	DESIGNED - MKW	REVISED -
USER NAME = jrmiller	DRAWN - TTP	REVISED -
PLOT SCALE = 20.0000 '/ in.	CHECKED - JMG	REVISED -
PLOT DATE = 6/18/2019	DATE - 6/21/19	REVISED -

STATE OF ILLINOIS	
DEPARTMENT OF TRANSPORTATION	

SCAL F

TYPICAL SECTIONS					F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
⊢ 90⁄94						90/94/290	2015-019R	COOK	1255	42
								CONTRACT	NO. 6	2A76
.E: NONE	SHEET 16	OF 17	SHEETS	STA.	TO STA.		ILLINOIS FED. AI	D PROJECT		

SCOPE OF WORK Jane Byrne Interchange (I-90/94 and I-290/Congress Parkway)

Contract 62A77 SB I-90/94 from Roosevelt Rd to Lake St/Madison St

Section 2015-018R Job Number C-91-311-15 PTB 163-001

July 2, 2019

This improvement consists of the construction of Southbound I-90/94 mainline from Roosevelt Road to Madison Street. It also includes construction of the following ramps: Southbound I-90/94 Madison Street Entrance Ramp, Southbound I-90/94 Exit Ramp to Jackson Boulevard, Southbound I-90/94 Exit Ramp to Adams Street, Ramp East to South (ES), Ramp West to South (WS), and Ramp South to West (SW) where it is combined with Ramp South to East (SE) and the Southbound I-90/94 Exit Ramp to Taylor Street. This work also includes the construction of Retaining Wall 34 (SN 016-1823) as well as modifications to existing Retaining Wall 5 (SN 016-1164) and existing Retaining Wall 50 (SN 016-1189).

The length of improvement is approximately 8,815 ft. The work includes mainline pavement reconstruction, ramp pavement reconstruction, pavement resurfacing, pavement widening, Accident Investigation Site reconstruction, retaining wall construction, retaining wall modifications, drainage, detention storage tank construction, details around utilities and water tunnels, signing, traffic control and protection, lighting, ITS installation, landscaping, urban enhancements and pavement markings.

Pavement resurfacing is proposed in the following location:

- Southbound I-90/94 south of Madison Street to tie into existing pavement

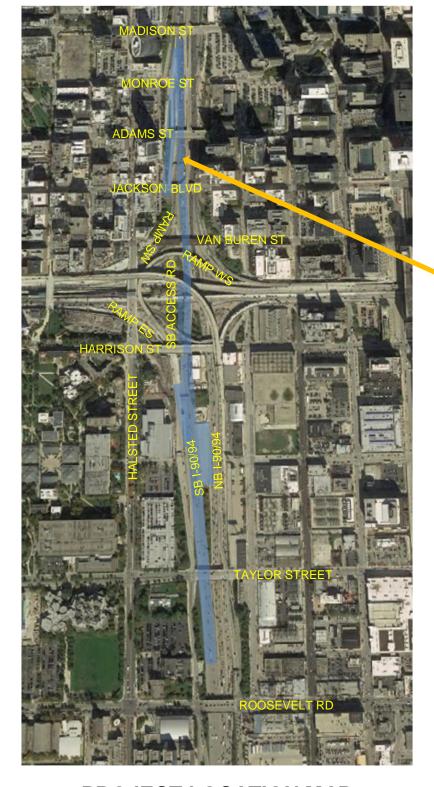
Proposed final pavement will be constructed at the following locations:

- Southbound I-90/94 between Madison Street and Roosevelt Road
- Southbound I-90/94 Madison Street Entrance Ramp bridge approach to Southbound I-90/94 merge
- Ramp SW from Southbound I-90/94 to the Ramp SE and SB Taylor Exit Ramp split
- Southbound I-90/94 Access Road
- Ramp ES where it merges with Southbound I-90/94
- Ramp WS where it merges with Southbound I-90/94
- Accident Investigation Site between the Southbound and Northbound I-90/94 mainlines

Pavement widening is proposed in the following location:

 Southbound I-90/94 north of Roosevelt Road to adjust the lane configuration to tie into existing

PROJECT LOCATION

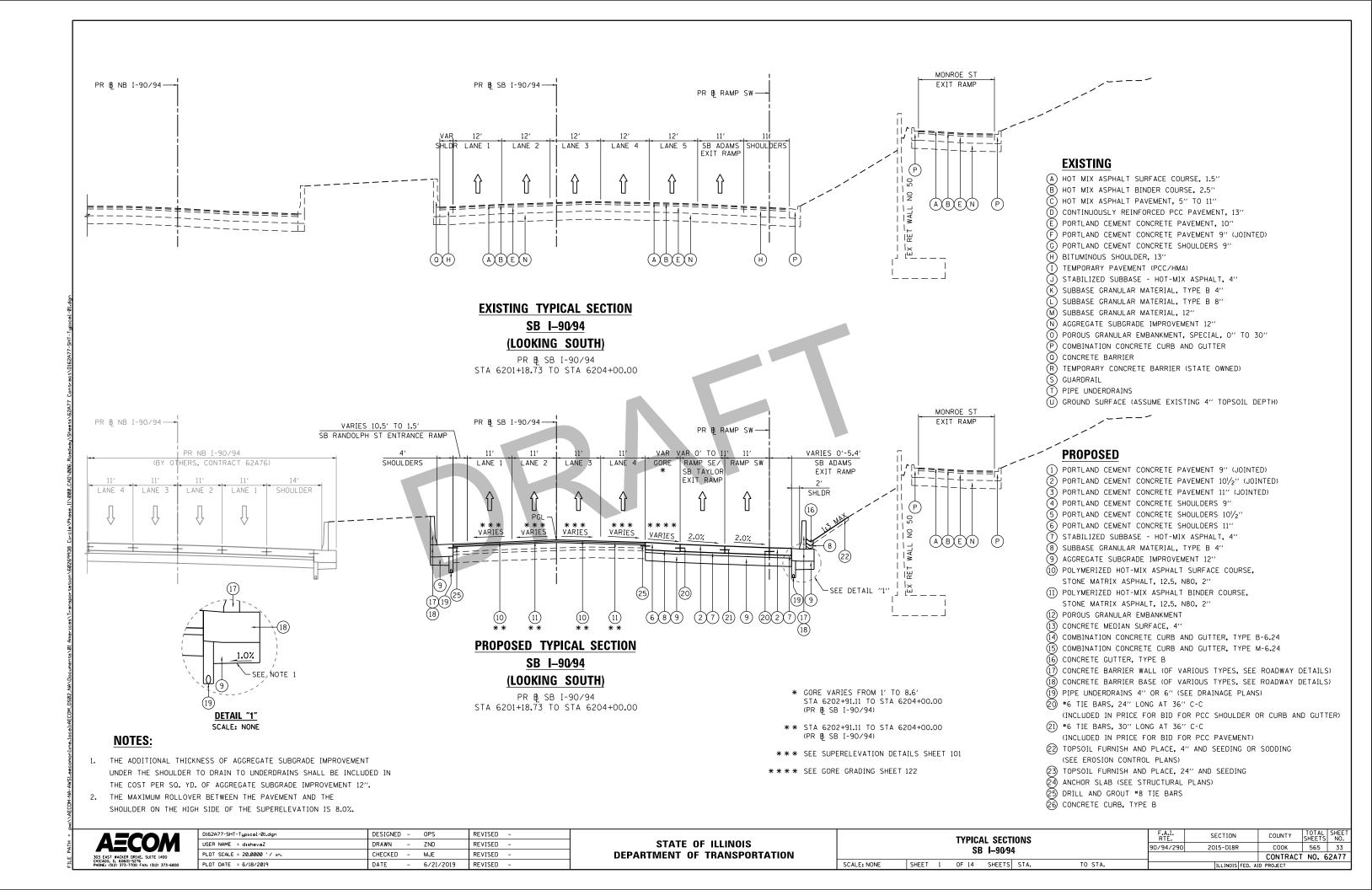


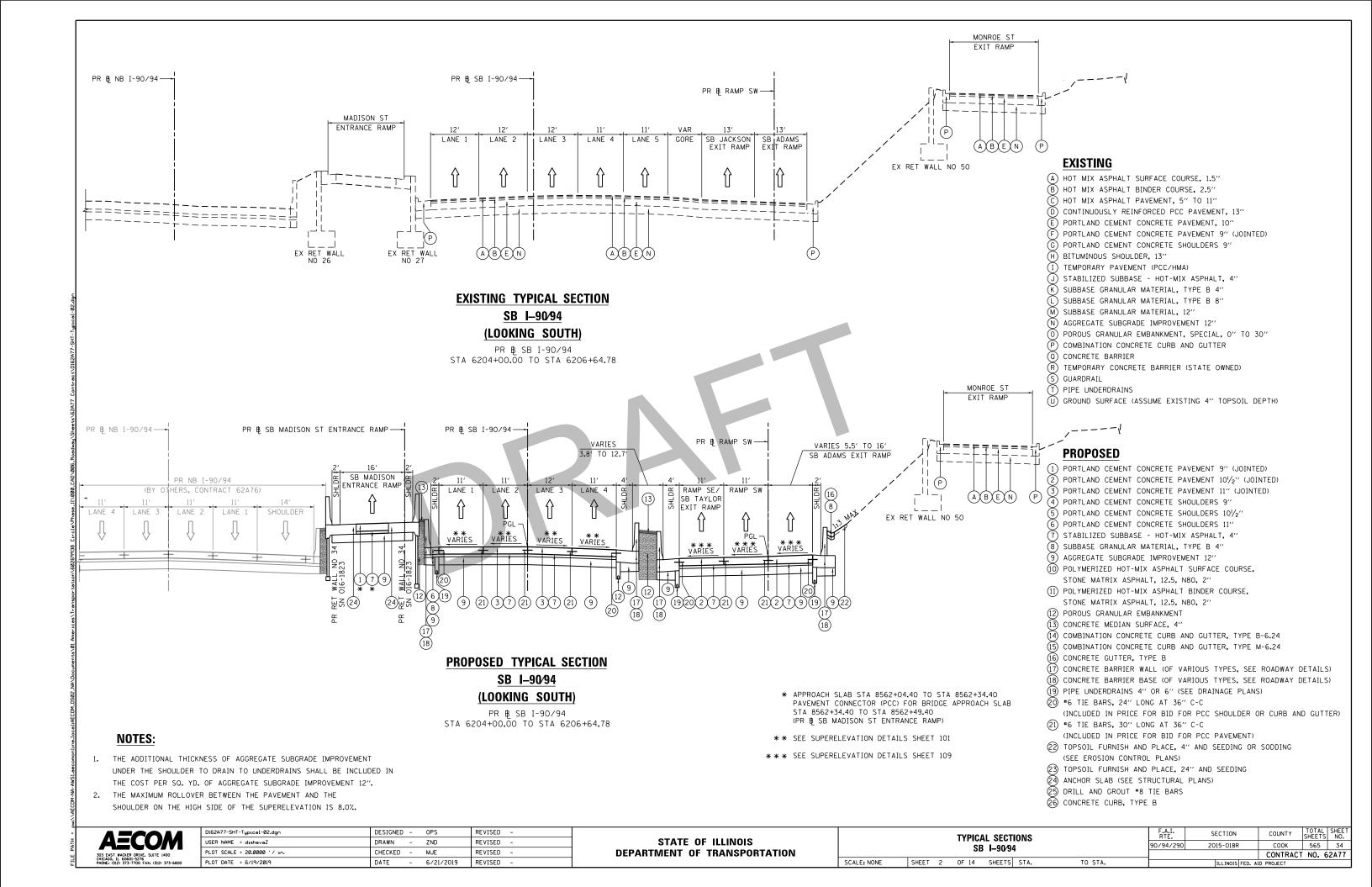
PROJECT LOCATION MAP

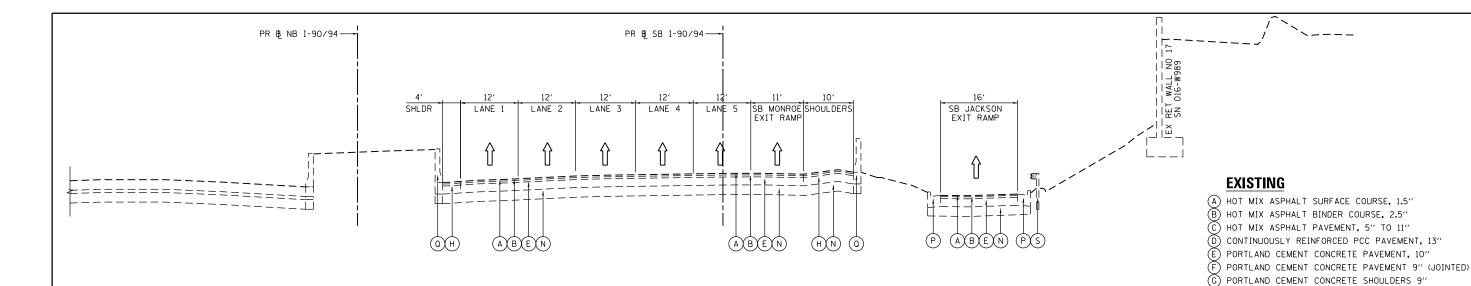
CONTRACT 62A77

SB I-90/94 from Roosevelt Rd to Lake St/Madison St SECTION 2015-018R C-91-311-15

NOT TO SCALE

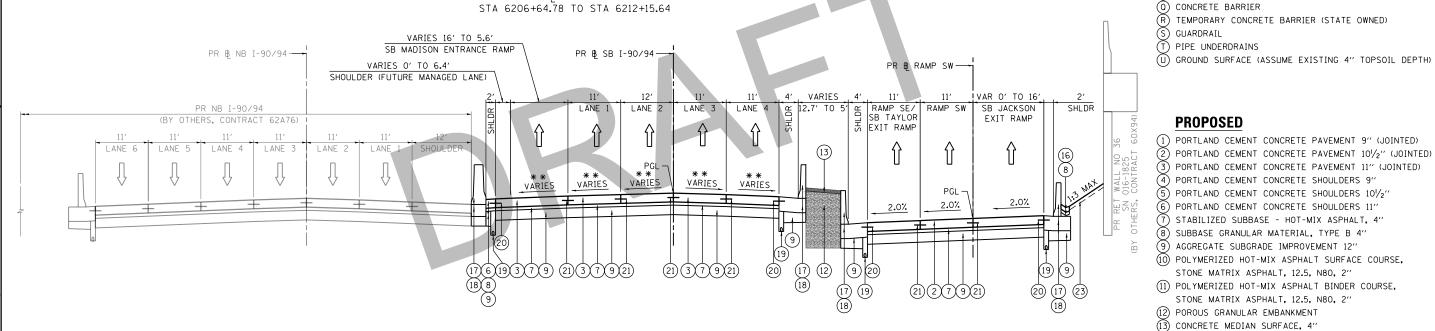






EXISTING TYPICAL SECTION SB I-90/94 (LOOKING SOUTH)

PR B SB I-90/94 STA 6206+64.78 TO STA 6212+15.64



PROPOSED TYPICAL SECTION SB I-90/94

* * SEE SUPERELEVATION DETAILS SHEET 102

SCALE: NONE

(LOOKING SOUTH)

PR B SB I-90/94 STA 6206+64.78 TO STA 6212+15.64

NOTES:

- 1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

(INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT) (2) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)

(14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24 (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24

(19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)

(17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)

(23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING

(24) ANCHOR SLAB (SEE STRUCTURAL PLANS) (25) DRILL AND GROUT *8 TIE BARS

(20) #6 TIE BARS, 24" LONG AT 36" C-C

(21) #6 TIE BARS, 30" LONG AT 36" C-C

STONE MATRIX ASPHALT, 12.5, N80, 2"

STONE MATRIX ASPHALT, 12.5, N80, 2"

(16) CONCRETE GUTTER, TYPE B

(H) BITUMINOUS SHOULDER, 13" (I) TEMPORARY PAVEMENT (PCC/HMA)

PROPOSED

(J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4" (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"

O POROUS GRANULAR EMBANKMENT, SPECIAL, O" TO 30"

(L) SUBBASE GRANULAR MATERIAL, TYPE B 8" (M) SUBBASE GRANULAR MATERIAL, 12"

(N) AGGREGATE SUBGRADE IMPROVEMENT 12"

(P) COMBINATION CONCRETE CURB AND GUTTER

(26) CONCRETE CURB, TYPE B

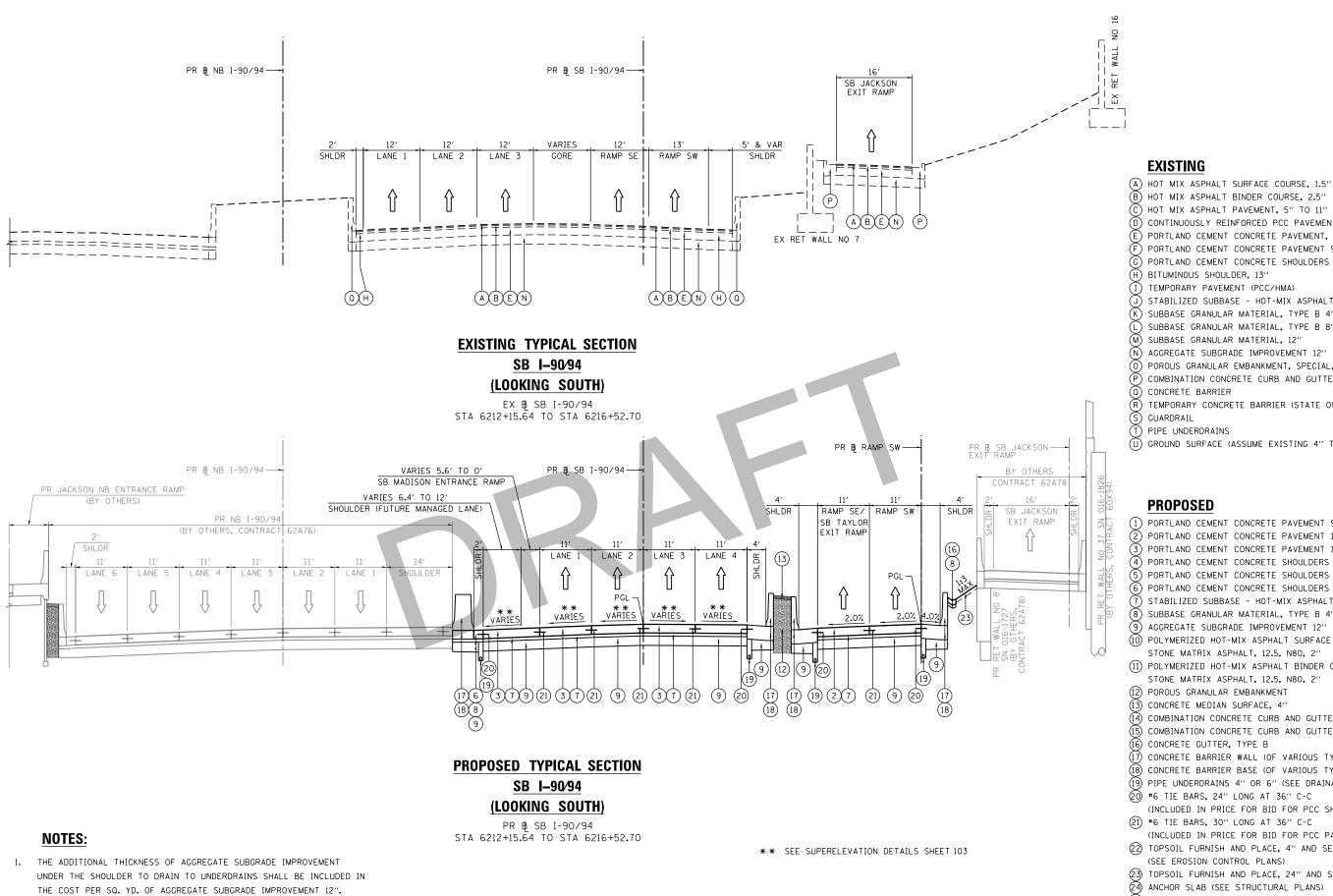
AECOM	
A=CUM	
303 EAST WACKER DRIVE, SUITE 1400	
CHICAGO, IL 60601-5276 PHONE: (312) 373-7700 FAX: (312) 373-6800	

D162A77-SHT-Typical-03.dgn	DESIGNED -	OPS	REVISED -
USER NAME = dishevaZ	DRAWN -	ZND	REVISED -
PLOT SCALE = 20.0000 ' / 10.	CHECKED -	MJE	REVISED -
PLOT DATE = 6/18/2019	DATE -	6/21/2019	REVISED -

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

		TYPICA SB	L SECT I-90/9	
SHEET	3	OF 14	SHEETS	STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEE NO.
90/94/290	2015-018R	соок	565	35
		CONTRACT	NO. 6	2A77
	ILL INOIS FED. A	ID PROJECT		



EXISTING

(B) HOT MIX ASPHALT BINDER COURSE, 2.5" (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11" (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13" (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10" (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED) (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"

(H) BITUMINOUS SHOULDER, 13"

TEMPORARY PAVEMENT (PCC/HMA)

J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"

(K) SUBBASE GRANULAR MATERIAL, TYPE B 4" (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"

(M) SUBBASE GRANULAR MATERIAL, 12"

(N) AGGREGATE SUBGRADE IMPROVEMENT 12"

O) POROUS GRANULAR EMBANKMENT, SPECIAL, O" TO 30"

P) COMBINATION CONCRETE CURB AND GUTTER

(Q) CONCRETE BARRIER

R) TEMPORARY CONCRETE BARRIER (STATE OWNED)

(S) GUARDRAIL

(T) PIPE UNDERDRAINS

(U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

1 PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED) PORTLAND CEMENT CONCRETE PAVEMENT 101/2" (JOINTED)

(3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)

(4) PORTLAND CEMENT CONCRETE SHOULDERS 9"

(5) PORTLAND CEMENT CONCRETE SHOULDERS 101/2"

(6) PORTLAND CEMENT CONCRETE SHOULDERS 11"

(7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"

(8) SUBBASE GRANULAR MATERIAL, TYPE B 4"

(9) AGGREGATE SUBGRADE IMPROVEMENT 12"

POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"

(11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE,

STONE MATRIX ASPHALT, 12.5, N80, 2"

(12) POROUS GRANULAR EMBANKMENT

(13) CONCRETE MEDIAN SURFACE, 4"

(14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24

(15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24

(16) CONCRETE GUTTER, TYPE B

(17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)

(20) #6 TIE BARS, 24" LONG AT 36" C-C

(INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)

(21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)

(22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)

(23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING

(24) ANCHOR SLAB (SEE STRUCTURAL PLANS) (25) DRILL AND GROUT *8 TIE BARS

(26) CONCRETE CURB, TYPE B

2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE

SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

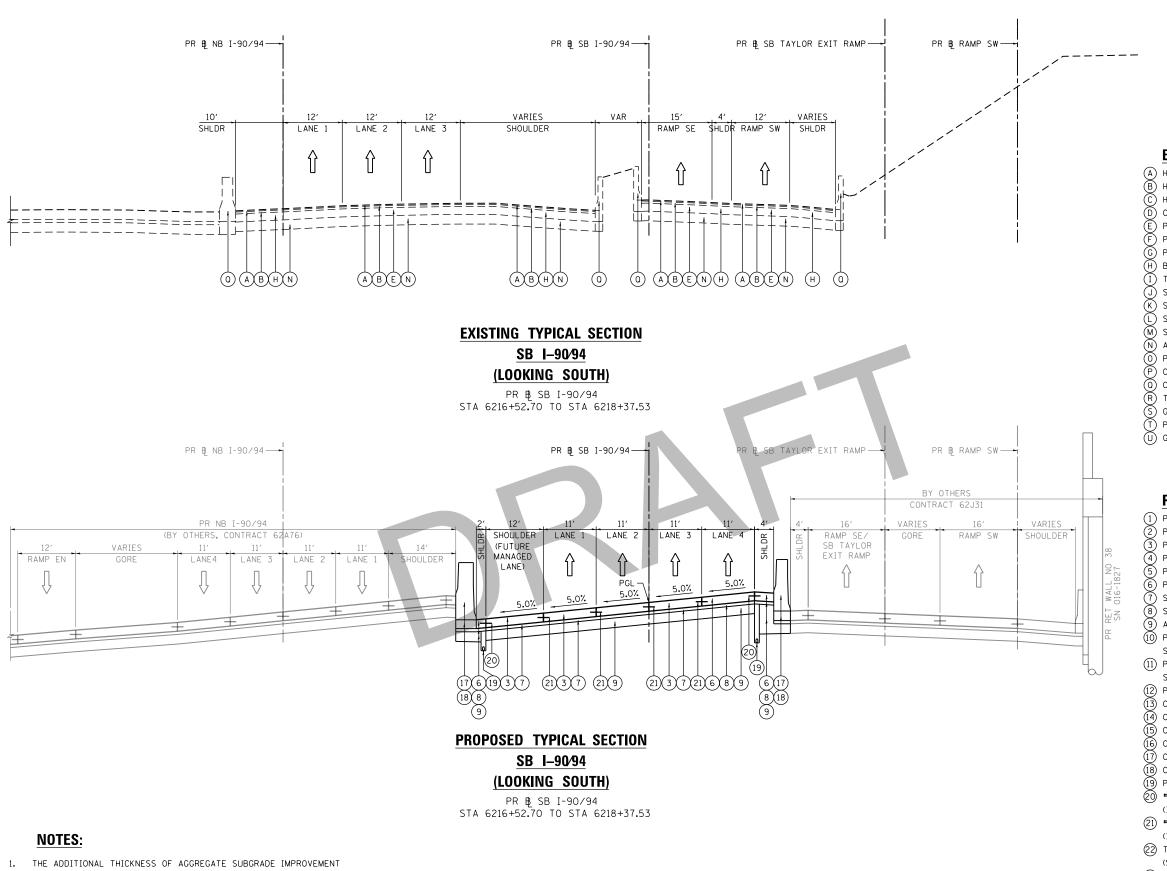
D162A77-SHT-Typical-04.dgn DESIGNED - OPS REVISED USER NAME = dishevaZ DRAWN - ZND REVISED PLOT DATE = 6/18/2019 REVISED - 6/21/2019

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

TYPICAL SECTIONS SB I-90/94 SHEET 4 OF 14 SHEETS STA.

SCALE: NONE

COOK 565 36 90/94/290 2015-018R CONTRACT NO. 62A77



EXISTING

(A) HOT MIX ASPHALT SURFACE COURSE, 1.5" (B) HOT MIX ASPHALT BINDER COURSE, 2.5" (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11" (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13" (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10" F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED) (G) PORTLAND CEMENT CONCRETE SHOULDERS 9" (H) BITUMINOUS SHOULDER, 13" (I) TEMPORARY PAVEMENT (PCC/HMA) (J) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4" (K) SUBBASE GRANULAR MATERIAL, TYPE B 4" (L) SUBBASE GRANULAR MATERIAL, TYPE B 8" (M) SUBBASE GRANULAR MATERIAL, 12" (N) AGGREGATE SUBGRADE IMPROVEMENT 12" O POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30" P COMBINATION CONCRETE CURB AND GUTTER (Q) CONCRETE BARRIER R) TEMPORARY CONCRETE BARRIER (STATE OWNED) (S) GUARDRAIL T) PIPE UNDERDRAINS U GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

1 PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED) \bigcirc PORTLAND CEMENT CONCRETE PAVEMENT 10 $\frac{1}{2}$ " (JOINTED) (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED) (4) PORTLAND CEMENT CONCRETE SHOULDERS 9" (5) PORTLAND CEMENT CONCRETE SHOULDERS 101/2"

(6) PORTLAND CEMENT CONCRETE SHOULDERS 11" (7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"

(8) SUBBASE GRANULAR MATERIAL, TYPE B 4"

9) AGGREGATE SUBGRADE IMPROVEMENT 12" 10 POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE,

STONE MATRIX ASPHALT, 12.5, N80, $2^{\prime\prime}$ (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE,

STONE MATRIX ASPHALT, 12.5, N80, 2"

(12) POROUS GRANULAR EMBANKMENT

(13) CONCRETE MEDIAN SURFACE, 4"

(14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24 (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24

(16) CONCRETE GUTTER, TYPE B

(17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)

(20) #6 TIE BARS, 24" LONG AT 36" C-C

(INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER) (21) #6 TIE BARS, 30" LONG AT 36" C-C

(INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)

(22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)

(23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING

24 ANCHOR SLAB (SEE STRUCTURAL PLANS)
25 DRILL AND GROUT #8 TIE BARS

(26) CONCRETE CURB, TYPE B

UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN

THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".

SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

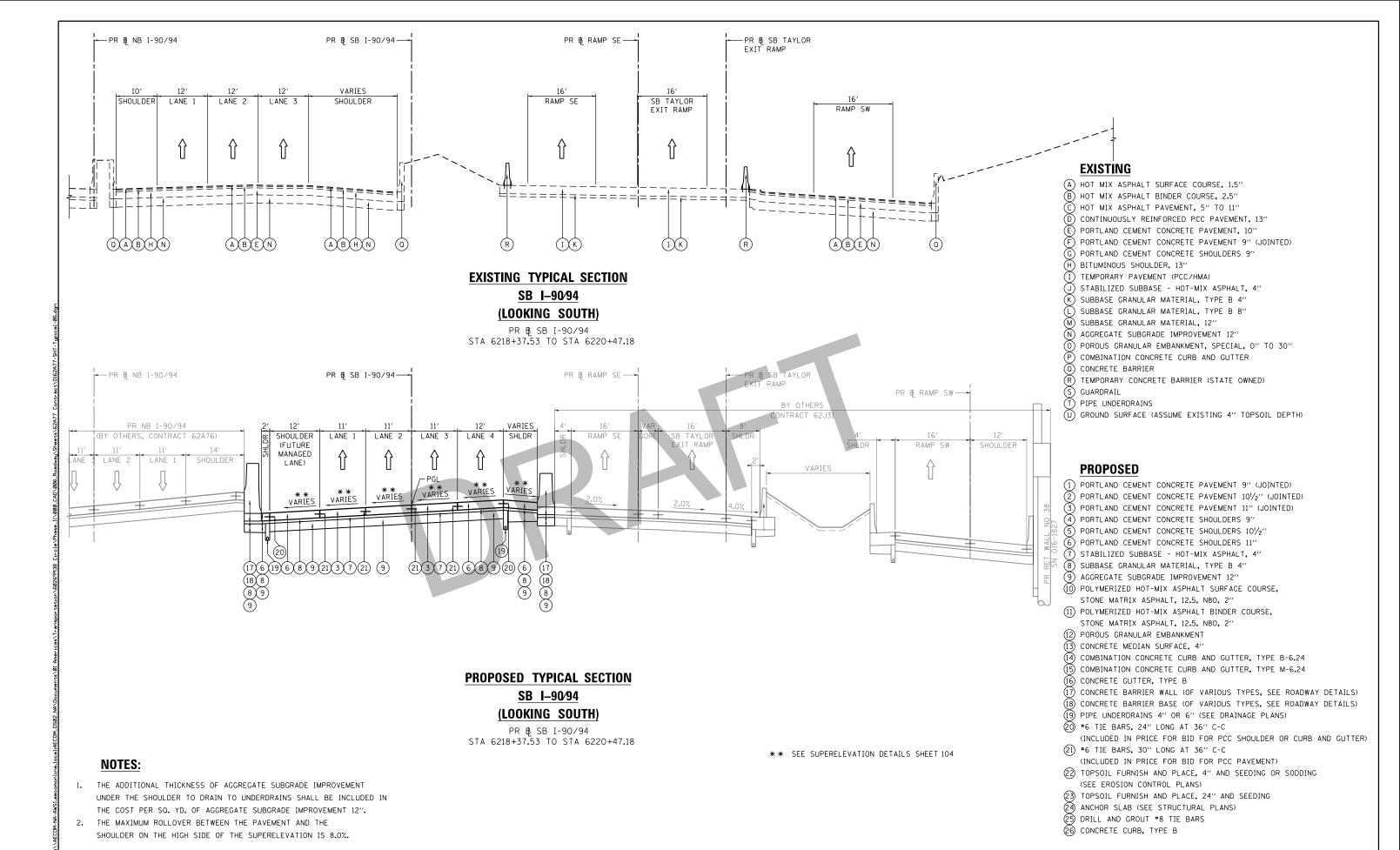
2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE

D162A77-SHT-Typical-05.dgn	DESIGNED	-	OPS	REVISED	-
USER NAME = dishevaZ	DRAWN	-	ZND	REVISED	-
PLOT SCALE = 20.0000 ' / in.	CHECKED	-	MJE	REVISED	-
PLOT DATE = 6/18/2019	DATE	-	6/21/2019	REVISED	-

STATE OF I	ILLINOIS
DEPARTMENT OF T	RANSPORTATION

SCALE: NONE

		TYPICA SB	L SECT			F.A.I. RTE. 90/94/290	SECTION 2015-018R	COUNTY COOK CONTRACT	TOTAL SHEETS 565	SHEET NO. 37
								LUNIKAL	NU. C	ZAII
SHEET	5	OF 14	SHEETS	STA.	TO STA.		ILLINOIS FED	. AID PROJECT		



AECOM

303. EAST MACKER DRIVE. SUITE 1400
CHICAGO, IL 65601-5276
AUGUST 18 AG 13123 373-5800

 D162A77-SHT-Typ1col-06.dgn
 DESIGNED
 OPS
 REVISED

 USER NAME
 = dishevaZ
 DRAWN
 ZND
 REVISED

 PLOT SCALE
 = 20.0000 ' / in.
 CHECKED
 MJE
 REVISED

 PLOT DATE
 = 6/18/2019
 REVISED

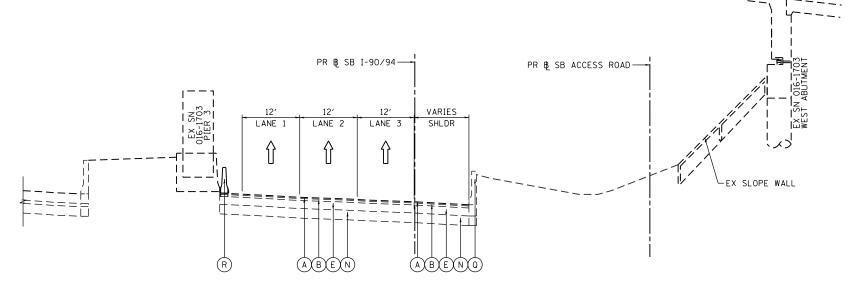
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SB I-90/94

SHEET 6 OF 14 SHEETS STA.

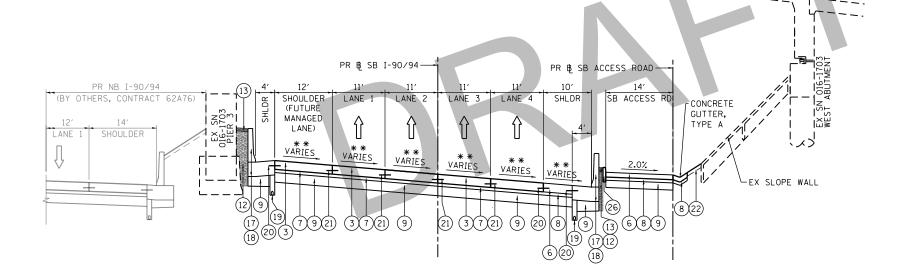
TO STA.

SCALE: NONE



EXISTING TYPICAL SECTION SB I-90/94 (LOOKING SOUTH)

PR B SB I-90/94 STA 6220+47.18 TO STA 6229+11.25



PROPOSED TYPICAL SECTION SB I-90/94 (LOOKING SOUTH)

PR **B** SB I-90/94 STA 6220+47.18 TO STA 6229+11.25 ** SEE SUPERELEVATION DETAILS SHEET 104 AND 105

NOTES:

- 1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

D162A77-SHT-Typical-07.dgn	DESIGNED -	0PS	REVISED -
USER NAME = dishevaZ	DRAWN -	ZND	REVISED -
PLOT SCALE = 20.0000 ' / 10.	CHECKED -	MJE	REVISED -
PLOT DATE = 6/18/2019	DATE -	6/21/2019	REVISED -

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

			TYPICAL SECTIONS SB I-90/94			
SCALE: NONE	SHEET	7	OF 14	SHEETS	STA.	

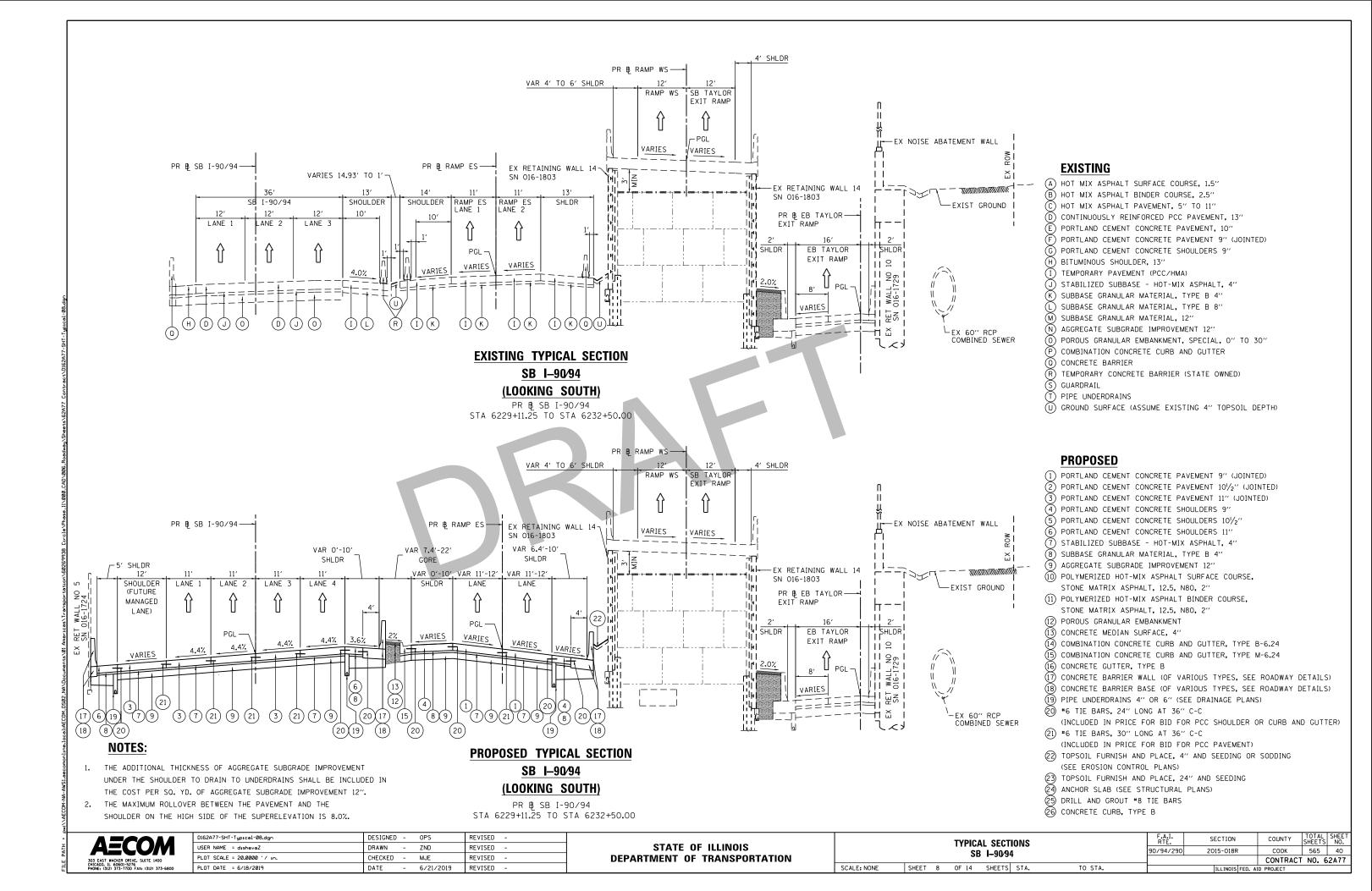
COOK 565 39 90/94/290 2015-018R CONTRACT NO. 62A77

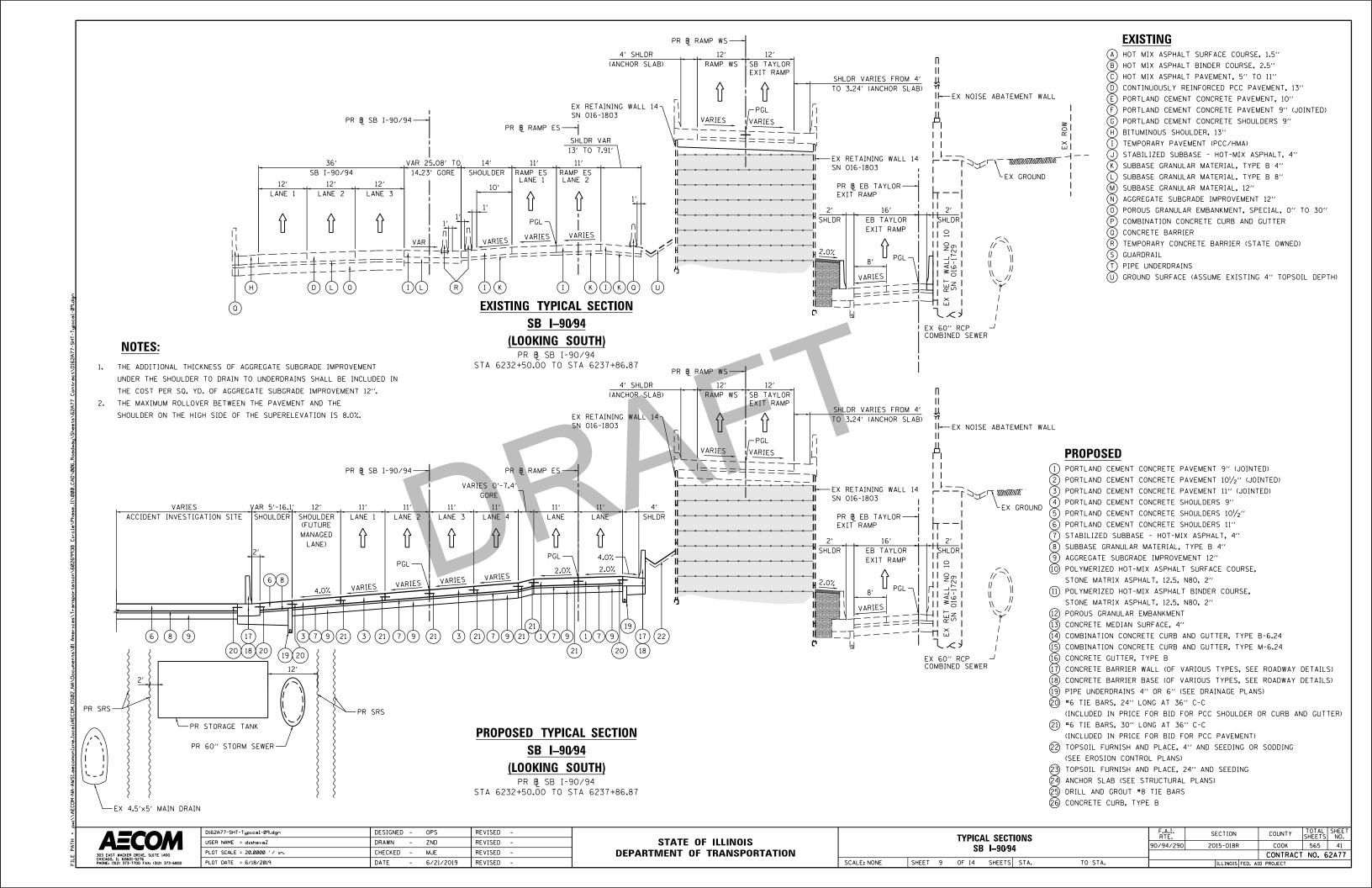
EXISTING

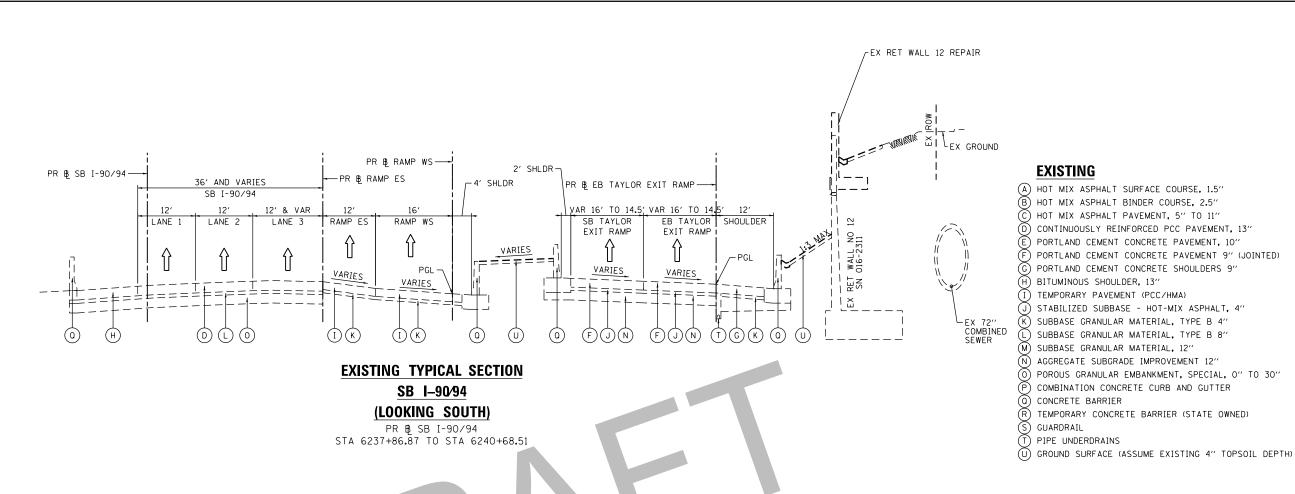
- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5" (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- (I) TEMPORARY PAVEMENT (PCC/HMA)
- (J) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- O POROUS GRANULAR EMBANKMENT, SPECIAL, O" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- R) TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

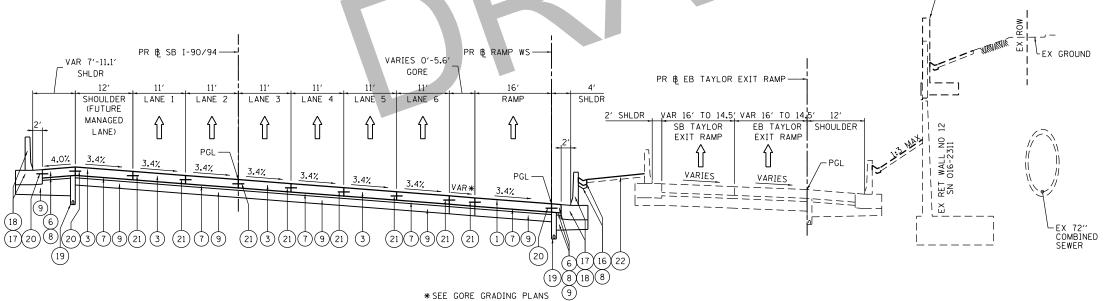
PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- 2 PORTLAND CEMENT CONCRETE PAVEMENT 101/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS $10\frac{1}{2}$ "
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (9) AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE,
- STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (16) CONCRETE GUTTER, TYPE B
- (17) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- ② #6 TIE BARS, 24" LONG AT 36" C-C
 - (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C
- (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (2) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING
- (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- (25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B









NOTES:

- 1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

PROPOSED TYPICAL SECTION SB I-90/94

(LOOKING SOUTH)

PR B SB I-90/94 STA 6237+86.87 TO STA 6240+68.51

D162A77-SHT-Typical-10.dgn	DESIGNED	-	0PS	REVISED	-
USER NAME = disheveZ	DRAWN	-	ZND	REVISED	-
PLOT SCALE = 20.0000 ' / in.	CHECKED	-	MJE	REVISED	-
PLOT DATE = 6/19/2019	DATE	-	6/21/2019	REVISED	-

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

			TYPICA SB	L SECT I-90/94	
SCALE: NONE	SHEET	10	OF 14	SHEETS	STA.

EX RET WALL 12 REPAIR

COOK 565 42 90/94/290 2015-018R CONTRACT NO. 62A77

PROPOSED

1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED) (2) PORTLAND CEMENT CONCRETE PAVEMENT 10 $\frac{1}{2}$ " (JOINTED)

(3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)

(4) PORTLAND CEMENT CONCRETE SHOULDERS 9"

(5) PORTLAND CEMENT CONCRETE SHOULDERS 101/2"

(6) PORTLAND CEMENT CONCRETE SHOULDERS 11"

(7) STABILIZED SUBBASE - HOT-MIX ASPHALT, 4"

(8) SUBBASE GRANULAR MATERIAL, TYPE B 4"

(9) AGGREGATE SUBGRADE IMPROVEMENT 12"

(10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"

(11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"

(12) POROUS GRANULAR EMBANKMENT

(13) CONCRETE MEDIAN SURFACE, 4"

(14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24

(15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24

(6) CONCRETE GUTTER, TYPE B
(7) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)

(19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)

20 #6 TIE BARS, 24" LONG AT 36" C-C

(INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)

(21) #6 TIE BARS, 30" LONG AT 36" C-C (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)

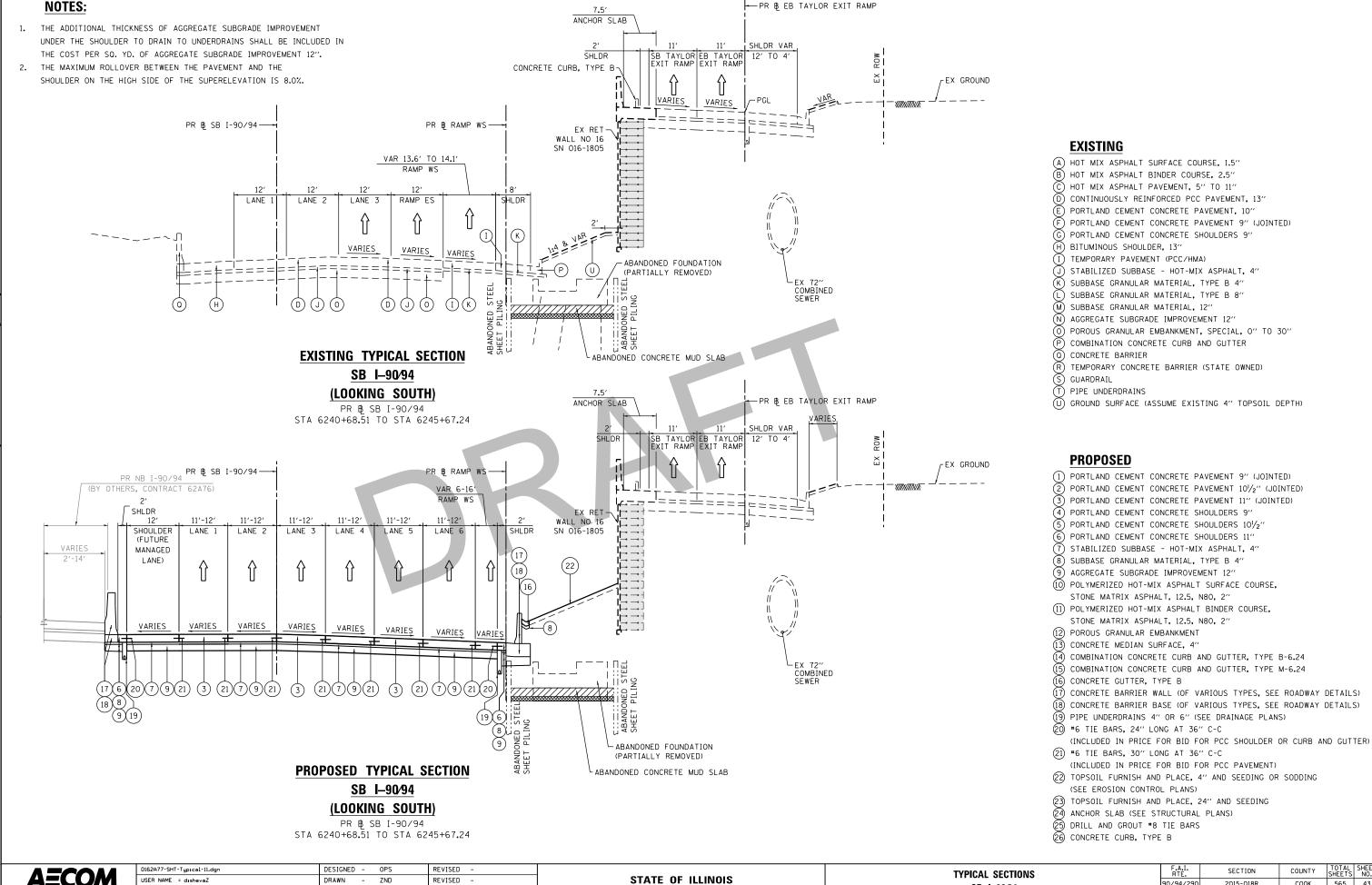
(22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)

(23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING

(24) ANCHOR SLAB (SEE STRUCTURAL PLANS) (25) DRILL AND GROUT #8 TIE BARS

(26) CONCRETE CURB, TYPE B

TO STA.



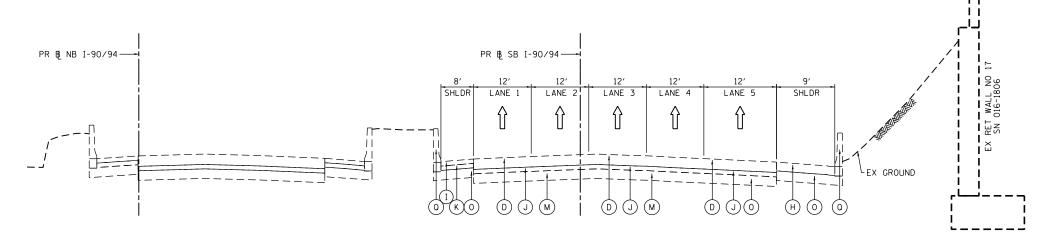
PLOT SCALE = 20.0000 '/ in. CHECKED - MJE REVISED PLOT DATE = 6/18/2019 DATE - 6/21/2019 REVISED

DEPARTMENT OF TRANSPORTATION

SB I-90/94 SCALE: NONE SHEET 11 OF 14 SHEETS STA.

TO STA.

COOK 565 43 90/94/290 2015-018R CONTRACT NO. 62A77

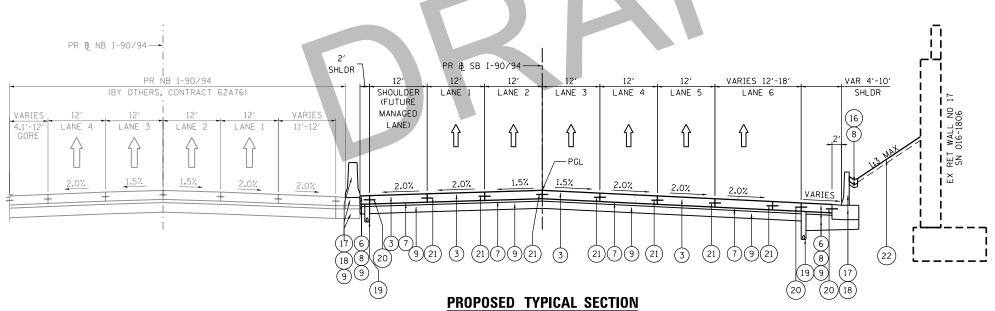


EXISTING TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR B SB I-90/94 STA 6245+67.24 TO STA 6248+65.35



NOTES:

- 1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

SB I-90/94 (LOOKING SOUTH)

PR B SB I-90/94 STA 6245+67.24 TO STA 6248+65.35

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5" (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- (C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- I) TEMPORARY PAVEMENT (PCC/HMA)
- (K) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
 (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- O POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- R TEMPORARY CONCRETE BARRIER (STATE OWNED)
 S GUARDRAIL
- T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (2) PORTLAND CEMENT CONCRETE PAVEMENT $10\frac{1}{2}$ " (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 101/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- 9 AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (1) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- 12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (6) CONCRETE GUTTER, TYPE B
 (7) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C
 - (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C
 - (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- 25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B

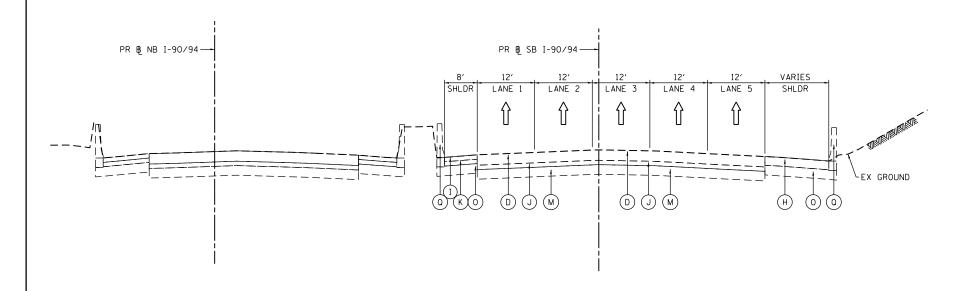
AECOM
303 EAST WACKER DRIVE, SUITE 1400 CHICAGO, IL 60601-5276

D162A77-SHT-Typical-12.dgn	DESIGNED	-	0PS	REVISED	-
USER NAME = dishevaZ	DRAWN	-	ZND	REVISED	-
PLOT SCALE = 20.0000 ' / in.	CHECKED	-	MJE	REVISED	-
PLOT DATE = 6/18/2019	DATE	-	6/21/2019	REVISED	-

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

				L SECT	
SCALE: NONE	SHEET	12	0F 14	SHEETS	STA.

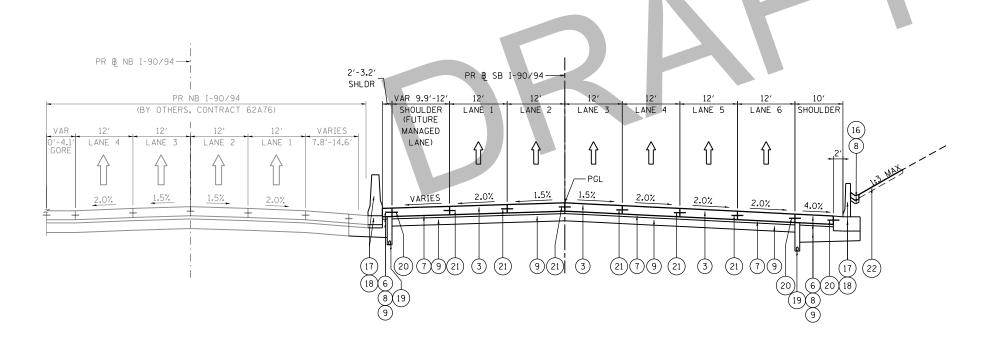
COOK 565 44 90/94/290 2015-018R CONTRACT NO. 62A77



EXISTING TYPICAL SECTION SB I-90/94

(LOOKING SOUTH)

PR B SB I-90/94 STA 6248+65.35 TO STA 6252+85.00



NOTES:

- 1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SO. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

PROPOSED TYPICAL SECTION SB I-90/94

(LOOKING SOUTH) PR B SB I-90/94 STA 6248+65.35 TO STA 6252+85.00

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5" (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- TEMPORARY PAVEMENT (PCC/HMA)
- (K) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
 (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- O POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (Q) CONCRETE BARRIER
- R TEMPORARY CONCRETE BARRIER (STATE OWNED)
 S GUARDRAIL
- T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- 1) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- 2) PORTLAND CEMENT CONCRETE PAVEMENT 101/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 101/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- 9 AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (11) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- 12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (6) CONCRETE GUTTER, TYPE B
 (7) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C
- (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C
- (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- 25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B

TO STA.

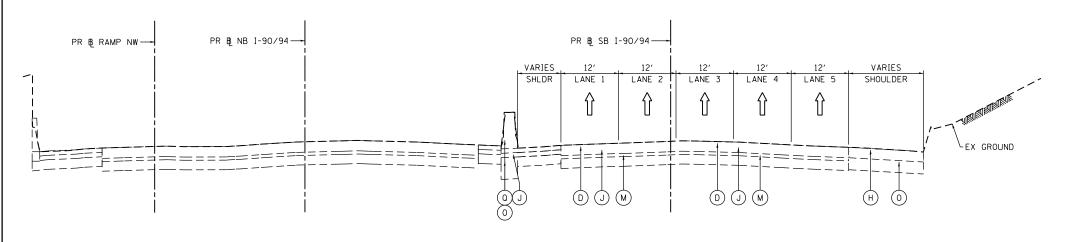
AECOM
303 EAST WACKER DRIVE, SUITE 1400 CHICAGO, IL 60601-5276

D162A77-SHT-Typical-13.dgn	DESIGNED	-	OPS	REVISED -
USER NAME = dishevaZ	DRAWN	-	ZND	REVISED -
PLOT SCALE = 20.0000 ' / in.	CHECKED	-	MJE	REVISED -
PLOT DATE = 6/18/2019	DATE	-	6/21/2019	REVISED -

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

			TYPICAL SECTION: SB I-90/94		
SCALE: NONE	SHEET	13	0F 14	SHEETS	STA.

COOK 565 45 90/94/290 2015-018R CONTRACT NO. 62A77

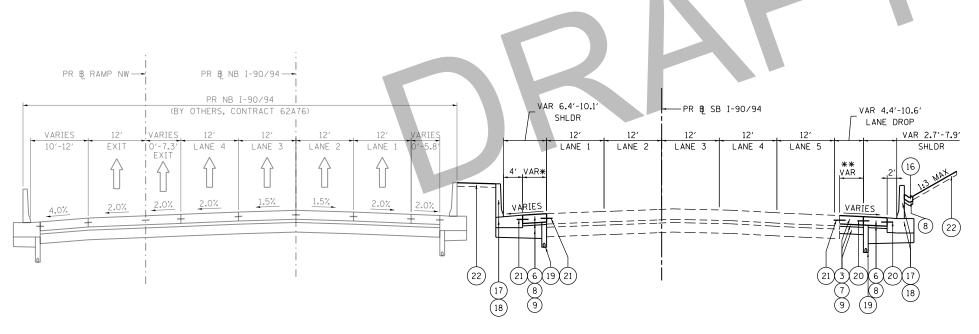


EXISTING TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR B SB I-90/94 STA 6252+85.00 TO STA 6256+00.00



* PAVEMENT WIDENING VARIES 0'-6.1' STA 6252+85.00 TO STA 6254+89.51 **PAVEMENT WIDENING VARIES 1'-7.8' STA 6252+85.00 TO STA 6255+48.00

NOTES:

- 1. THE ADDITIONAL THICKNESS OF AGGREGATE SUBGRADE IMPROVEMENT UNDER THE SHOULDER TO DRAIN TO UNDERDRAINS SHALL BE INCLUDED IN THE COST PER SQ. YD. OF AGGREGATE SUBGRADE IMPROVEMENT 12".
- 2. THE MAXIMUM ROLLOVER BETWEEN THE PAVEMENT AND THE SHOULDER ON THE HIGH SIDE OF THE SUPERELEVATION IS 8.0%.

PROPOSED TYPICAL SECTION

SB I-90/94

(LOOKING SOUTH)

PR B SB I-90/94 STA 6252+85.00 TO STA 6256+00.00

EXISTING

- (A) HOT MIX ASPHALT SURFACE COURSE, 1.5"
- (B) HOT MIX ASPHALT BINDER COURSE, 2.5"
- C) HOT MIX ASPHALT PAVEMENT, 5" TO 11"
- (D) CONTINUOUSLY REINFORCED PCC PAVEMENT, 13"
- (E) PORTLAND CEMENT CONCRETE PAVEMENT, 10"
- (F) PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- (G) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (H) BITUMINOUS SHOULDER, 13"
- I TEMPORARY PAVEMENT (PCC/HMA)
- (K) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
 (K) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- (L) SUBBASE GRANULAR MATERIAL, TYPE B 8"
- (M) SUBBASE GRANULAR MATERIAL, 12"
- (N) AGGREGATE SUBGRADE IMPROVEMENT 12"
- O POROUS GRANULAR EMBANKMENT, SPECIAL, 0" TO 30"
- (P) COMBINATION CONCRETE CURB AND GUTTER
- (0) CONCRETE BARRIER
- R TEMPORARY CONCRETE BARRIER (STATE OWNED)
- (S) GUARDRAIL
- T) PIPE UNDERDRAINS
- (U) GROUND SURFACE (ASSUME EXISTING 4" TOPSOIL DEPTH)

PROPOSED

- 1 PORTLAND CEMENT CONCRETE PAVEMENT 9" (JOINTED)
- 2) PORTLAND CEMENT CONCRETE PAVEMENT 101/2" (JOINTED)
- (3) PORTLAND CEMENT CONCRETE PAVEMENT 11" (JOINTED)
- (4) PORTLAND CEMENT CONCRETE SHOULDERS 9"
- (5) PORTLAND CEMENT CONCRETE SHOULDERS 101/2"
- (6) PORTLAND CEMENT CONCRETE SHOULDERS 11"
- (7) STABILIZED SUBBASE HOT-MIX ASPHALT, 4"
- (8) SUBBASE GRANULAR MATERIAL, TYPE B 4"
- 9 AGGREGATE SUBGRADE IMPROVEMENT 12"
- (10) POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- (1) POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, 12.5, N80, 2"
- 12) POROUS GRANULAR EMBANKMENT
- (13) CONCRETE MEDIAN SURFACE, 4"
- (14) COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.24
- (15) COMBINATION CONCRETE CURB AND GUTTER, TYPE M-6.24
- (6) CONCRETE GUTTER, TYPE B
 (7) CONCRETE BARRIER WALL (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (18) CONCRETE BARRIER BASE (OF VARIOUS TYPES, SEE ROADWAY DETAILS)
- (19) PIPE UNDERDRAINS 4" OR 6" (SEE DRAINAGE PLANS)
- (20) #6 TIE BARS, 24" LONG AT 36" C-C
 - (INCLUDED IN PRICE FOR BID FOR PCC SHOULDER OR CURB AND GUTTER)
- (21) #6 TIE BARS, 30" LONG AT 36" C-C
- (INCLUDED IN PRICE FOR BID FOR PCC PAVEMENT)
- (22) TOPSOIL FURNISH AND PLACE, 4" AND SEEDING OR SODDING (SEE EROSION CONTROL PLANS)
- (23) TOPSOIL FURNISH AND PLACE, 24" AND SEEDING
- (24) ANCHOR SLAB (SEE STRUCTURAL PLANS)
- 25) DRILL AND GROUT #8 TIE BARS
- (26) CONCRETE CURB, TYPE B

TO STA.

4 - 6 - 4 -
303 EAST WACKER DRIVE, SUITE 1400
CHICAGO, IL 60601-5276

D162A77-SHT-Typical-14.dgn	DESIGNED	-	OPS	REVISED	-
USER NAME = dishevaZ	DRAWN	-	ZND	REVISED	-
PLOT SCALE = 20.0000 ' / 10.	CHECKED	-	MJE	REVISED	-
PLOT DATE = 6/18/2019	DATE	-	6/21/2019	REVISED	-

STATE OF ILLINOIS **DEPARTMENT OF TRANSPORTATION**

			TYPICA SB	L SECT	
SCALE: NONE	SHEET	14	OF 14	SHEETS	STA.

COOK 565 46 90/94/290 2015-018R CONTRACT NO. 62A77

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 08/26/2019 PROJECT AND TRAFFIC INPUTS (Enter Data in Gray Shaded Cells)

Route: I-90/94 Mainline Comments: Circle Interchange Project Contract 62A76 & 62A77

Section: 2015-019R County: Cook Design Date: 08/02/2019 ONP <- BY

Location: Circle Interchange Modify Date: <-- BY ADT Year 197,000 2012 200,000 2040 Future:

Facility Type Interstate or Freeway # of Lanes = 6 or more

> Road Class: Rural or Urban? Urban

Subgrade Support Rating (SSR): Poor Construction Year: 2020 Design Period (DP) = 20 years

Structural Design Traffic Minimum Actual Actual %of % of ADT in ADT ADT **Total ADT** Design Lane PV = 175,057 88.0% P = 8% 0 SU = 500 7,957 4.0% S= 37% MU = 1500 15,914 8.0% M = 37% Struct. Design ADT = 198,929 (2030)

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT

RIGID PAVEMENT Cpv = 0.15 Cpv = 0.15 Csu = 132.5 Csu = 143.81 Cmu = 482.53 Cmu = 696.42

TF flexible (Actual) = 64.67 (Actual ADT) 90.52 (Actual ADT) TF rigid (Actual) =

TF flexible (Min) = 5.85 (Min ADT Fig. 54-2.C) TF rigid (Min) = 8.26 (Min ADT Fig. 54-2.C)

Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 64.67	Use TF rigid = 90.52
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.
Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 11.50 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA}) = 710 ksi (Fig. 54-5.D)	
Design HMA Strain (ε_{HMA}) = 37 (Fig. 54-5.E)	CRC Pavement
Full Depth HMA Design Thickness = 16.75 in. (Fig. 54-5.F)	Use TF rigid = 90.52
Goto Map Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	IBR value ≃ 3
Use Full-Depth HMA Thickness = 14.75 inches	CRCP Thickness = 12.50 in. (Fig. 54-4.M)

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS						
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay					
Use TF flexible = 64.67 HMA Overlay Design Thickness = 14.75 in. (Fig. 54-5.U) Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.					
Use HMA Overlay Thickness = 10.75 inches	CRCP Thickness = 11.50 inches					

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more One-way Streets with ADT > 3500	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)

	Min. Str. Design Traffic (Fig 54-2.C)					
Facility Type	PV	SU	MU			
Interstate or Freeway	0	500	1500			
Other Marked State Route	0	250	750			
Unmarked State Route	No Min	No Min	No Min			

	Traffic Factor ESAL Coefficients						
	Rigid (Fig. 54-4.C)	Flexible (Fig. 54-5.				
Class	Csu	Cmu	Csu	Cmu			
	143.81	696.42	132.50	482.53			
II	135.78	567.21	112.06	385.44			
III	129.58	562.47	109.14	384.35			
IV	129.58	562,47	109.14	384.35			

Class Table for					
One-Way Streets					
ADT Class					
0 - 3500	II				
>3501	1				

Class	Class Table for					
2 or 3	3 lanes					
(not futur	e 4 lane &					
not one-way street)						
ADT	Class					
0 - 749	IV					
750 - 2000	Ш					
>2000	11					

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)						
		Rural			Urban		
Number of Lanes	Р	S	М	P	S	М	
1 Lane Ramp	100%	100%	100%	100%	100%	100%	
2 or 3	50%	50%	50%	50%	50%	50%	
4	32%	45%	45%	32%	45%	45%	
6 or more	20%	40%	40%	8%	37%	37%	

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

							-
				:		•	<i>i</i>
ROUTE	1-290	Mainline nea	ar Morgan St 2013-012R				
SECTION COUNTY			2013-012R Cook				
LOCATION		Circle	Interchange				
FACILITY TYPE		ı	NTERSTATE				
PROJECT LENGTH				FT ==>	0.37	Miles	
# OF CENTERLINES # OF LANES				CL LANES			
# OF EDGES				EP			
LANE WIDTH - AVERAGE				FT			
SHOULDER WIDTH HMA	Left			14			
HMA	Right	.lala.aa		FT			
Lotat Width	of Paved Shou	liders	8	FT			
PAVEMENT THICKNESS (FLEXIBLE)			14.50	IN	14 76	IN MAX	
SHOULDER THICKNESS			8.00			Standar	
POLICY OVERLAY THICKNESS			3.75	IN			_
FLEV BANCHICUT - TO LEGIO EL OTO CO	_						
FLEX PAVEMENT TRAFFIC FACTOR	.5		MINIMUM 5.85		ACTUAL 26.89		USE 26.89
•							Read Me
HMA COST PER TON			100000000000000000000000000000000000000	valenda saa saani	UNIT PRICE		read we
HMA SURFACE					\$113.60		
HMA TOP BINDER					\$96.95		
HMA LOWER BINDER HMA BINDER (LEVELING)					\$65.35 \$96.95		
HMA SHOULDER					\$72.00		
Manufacturing the product of the pro		steambashirit santan a risme.	to built depend on colore proper *			- Paris Children	artesiado), escultir tabarento (arte en centro
WITH AGOTO							
INITIAL COSTS ITEM	THICKNESS	1009	6 QUANTITY	LIMIT	UNIT PRICE		COST
T DECTY	TENORALOO	1007	UCCANTELL	01411	ONIT FRICE		
HMA PAVEMENT (FULL-DEPTH)	(14.50")	16875	15,680	SQ YD *	\$62.63	/SQ YD	\$982,038 -
HAVA CHOUVE CONDEC	(0 00K)		4.700		71.000000000000000		**
HMA SURFACE COURSE HMA TOP BINDER COURSE	(2.00*) (2.25*)		1,760 1,990		\$113.60 \$96.95		\$0 \$0
HMA LOWER BINDER COURSE	(10.25")	14417	9,196		\$65.35		\$0
	The street of th	HILLSON FOR CONTRACTOR	Maran harita area area area	The control of the co	Marijan di Malajanan yili, tabup tergapan iyo as as a	eli de de la reconstrucción	nantakan kemitana kecaban keminin
NA CHOULDED	(0.000)						
HMA SHOULDER CURB & GUTTER	(8.00")	aperaparanananananan Aperaparananan		TONS LIN FT	\$72.00		\$56,197 ·
CONDRECOTTEN		100	, υ	LIN FI	\$30.00	/LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)			606	TONS	\$25.00	/TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	Wilself # 61 41	18,166	SQ YD	\$7.00	/ SQ YD	\$127,162
Reserved For User Supplied Item			. 0	UNITS	\$0.00	/UNITS	\$0
Reserved For User Supplied Item				UNITS		/UNITS	\$0 \$0
	. :						·
PAVEMENT REMOVAL SHOULDER REMOVAL		1	15,680			/SQ YD	\$235,200
SHOOLDER REMOVAL	•		1,742	รนาย	\$10.00	/ SQ YD	\$17,420
Note: * Denotes User Supplied Quantity	-				N INITIAL COST		\$1,433,167
	rı	EXIDLE CON	STRUCTION	HINDAL	COST PER MILE		\$157,462
MAINTENANCE COSTS:							
ITEM	THICKNESS		MATERIAL		UNIT COST		
ROUTINE MAINTENANCE ACTIVITY					\$0.00	LANE-MIL	E/YEAR
104 0750 47 0745 0705							
HMA OVERLAY PVMT SURF	(2.00")	4 50 50	Surface Mix			/SQ YD	
HMA SURFACE MIX	(3.75") (1.50")	1,0043 1,0043	Surface Mix	9.74 V Au		/SQYD	
HMA BINDER MIX	(2.25*)		Top Binder Mix			/SQ YD	
HMA OVERLAY SHLD (Year 30)	(1.75*)		Shoulder Mix			/SQ YD	
HMA OVERLAY SHLD	(2.00")		Shoulder Mix	20.20	\$8.06	/SQ YD	•
MILLING (2.00 IN)				2.00	\$3.00	/SQ YD	
					·		
	Mill & Fill Surf)		Surface Mix			/SQ YD	
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)		Shoulder Mix		\$78.06	/SQ YD	
PARTIAL DEPTH PVMT PATCH (MI	! & Fill +2.00 "}	Leve	ling Binder Mix	8.80	\$80.86	/ SQ YD	
	1 & Fill +2,00 "}	2310	Shoulder Mix		\$78.06		
LONGITUDINAL SHOULDER JOINT ROU CENTERLINE JOINT ROUT & SEAL	ι & SEAL					/ LIN FT	
RANDOM / THERMAL CRACK ROUT & S	EAL	(100% Rehab	= 110,00' / Stati	on / Lane)		/LINFT	
the second secon		100			the second section is		

FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

					GN	NDARD DESK	STA		
PRESEN WORT	COST	JNIT COST	NIT UI	(UN	QUANTITY	%		ITEM	E COSTS:
	·					····		· · · · · · · · · · · · · · · · · · ·	YEAR 5
	\$7,840	\$2.00	N FT	LIN	3,920	100.00%		LONG SHLD JT R&S	TEXT O
	\$19,600	\$2.00			9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00			6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72	YD	ŞQ	16	0.10%		PD PVMT PATCH M&F SURF	
\$35,97	\$41,700	0.8626 X	PW =			0.8626	PWFn ≂		
		•••	•					1	YEAR 10
	\$7,840	\$2.00	NFT	LIN	3,920	100.00%		LONG SHLD JT R&S	LEAK 10
	\$19,600	\$2.00			9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00			6,468	50.00%		RNDM / THRM CRACK R&S	
	\$6,452	\$82.72		SQ		0.50%		PD PVMT PATCH M&F SURF	
\$34,84	\$46,828	0.7441 X	PW =			0.7441	PWFn =		
								1	YEAR 15
	\$52,266	\$3.00) YD	SQ	17,422	100.00%		MILL PVMT & SHLD 2,00"	
	\$12,695	\$80.86) YD	SQ	157	1.00%	2.00"	PD PVMT PATCH M&F ADD'L	
	\$199,962	\$12.75			15,680	100.00%		HMA OVERLAY PVMT 2.00"	
	\$14,049	\$8.06		<u>so</u>	1,742	100.00%		HMA OVERLAY SHLD 2.00 "	
\$179,06	\$278,972	0.6419 X	PW =			0.6419	PWFn =		
									YEAR 20
	\$7,840	\$2.00			3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00			9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00			6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72		SQ	16	0.10%		PD PVMT PATCH M&F SURF	
\$23,08	\$41,700	0.5537 X	PW =			0.5537	PWFn≂		
		•	•				•		YEAR 25
	\$7,840	\$2.00			3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00			9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00			6,468	50.00%		RNDM / THRM CRACK R&S	
ድሳባ ኃይ	\$6,452	\$82.72	PW =	SQ	78	0.50%	DME-	PD PVMT PATCH M&F SURF	
\$22,36	\$46,828	0.4776 X	F-VV —		•	0.4776	PWFn=	HMA_SD	
								INTERSTATE	YEAR 30
	\$47,040	\$3.00			15,680	100.00%		MILL PVMT ONLY 2.00"	
	\$25,390	\$80.86			314	2.00%		PD PVMT PATCH M&F ADD'L	
	\$1,327	\$78.06		SQ		1.00%	2.00"	PD SHLD PATCH M&F SURF	
	\$342,591	\$21.85			15,680	100.00%		HMA OVERLAY PVMT 3.75 "	
\$176,59	\$12,293 \$428,641	\$7.06 0,4120 X	PW =	<u>SQ</u>	1,742	100.00% 0.4120	PWFn=	HMA OVERLAY SHLD 1.75 "	
Ψ.1.0,00	Ψ+L0,0+1	V,4120 X	, ,, _			0.7120	, ,,,,,,,		
	\$7,840	\$2.00	TET		3,920	100.00%		LONG SHLD JT R&S	YEAR 35
	\$19,600	\$2.00			9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00			6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72		SQ				PD PVMT PATCH M&F SURF	
\$14,81	\$41,700	0.3554 X	PW =	<u> </u>	10	0.10% 0.3554	PWFn =	LET VINIT FATOR WICE SURF	
								<u> </u>	YEAR 40
	\$7,840	\$2.00	V FT	LIN	3,920	100.00%		LONG SHLD JT R&S	TEAN 40
	\$19,600	\$2.00	₹FT	LIN	9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00	√FT	LIN	6,468	50.00%		RNDM / THRM CRACK R&S	
	\$6,452	\$82.72		SQ		0.50%		PD PVMT PATCH M&F SURF	
		0.3066 X	PW =	,		0.3066	PWFn =		
\$14,35	\$46,828								
	\$46,828								
\$14,35 \$501,09	\$46,828		· .						
	\$0	0.00 NANCE LIFE-CY	ne Miles	Lar	2.23		IVITY	ROUTINE MAINTENANCE ACT	

PCC PAVEMENT JPCP

ROUTE SECTION COUNTY LOCATION	1-290 1		ear Morgan St 2013-012R Cook e Interchange				
FACILITY TYPE			INTERSTATE				
PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH PCC PCC Total Wi	Left Ríght dth of Paved Shoul	ders	5 6 2 12 4 4	FT ==> CL LANES EP FT FT FT FT	0.37	Miles	
PAVEMENT THICKNESS (RIGID) SHOULDER THICKNESS		JPCP	11.00 11.00		TIED SHLD		
POLICY OVERLAY THICKNESS			3.75	IN			
RIGID PAVEMENT TRAFFIC FACT	rors		MINIMUM		ACTUAL		USE
Worksheet Construction Type is	Reconstruction	ų.	8.26		37.44 avement Type is		37.44 JPCP
INITIAL COSTS ITEM	THICKNESS	100	% QUANTITY	UNIT	UNIT PRICE		COST
JPC PAVEMENT	(11.00*)		15,680	SQ YD	\$47.42	/SQ YD	\$743,546
PAVEMENT REINFORCEMENT STABILIZED SUBBASE	(4.00")		0 16,333	SQ YD SQ YD	\$22.00 \$19.00		\$0 \$310,327
PCC SHOULDERS CURB & GUTTER				sq yd Lin ft	\$40.00 \$30.00	/SQ YD /LIN FT	\$69,680 \$0
SUBBASE GRAN MATL TY C IMPROVED SUBGRADE:	(~ 1.72*) Aggregate	Viem = 41 (TONS SQ YD	\$25.00 \$7.00	/TON /SQ YD	\$5,875 \$123,480
Reserved For User Supplied Item Reserved For User Supplied Item				UNITS UNITS		/UNITS	\$0 \$0
PAVEMENT REMOVAL SHOULDER REMOVAL	•	:	15,680 1,742		\$15.00 \$10.00		\$235,200 \$17,420
Note: * Denotes User Supplied Qua	ntitv		RIGID CON	STRUCTIC	N INITIAL COST		\$1,505,528
••		RIGID CO			COST PER MILE		\$165,413
	-			* .			
MAINTENANCE COSTS: ITEM	THICKNESS		MATERIAL	ï	UNIT COST		
ROUTINE MAINTENANCE ACTIVITY	•	Ţ			\$0.00	/ LANE-M	IILE / YEAR
HMA POLICY OVERLAY	(3.75")			8.76			1
HMA POLICY OVERLAY PVMT HMA SURFACE MIX	(3.75") (1.50")	1,6948	Surface Mix	3.70 1.50	\$21.85 \$9.56	/SQ YD	
HMA BINDER MIX	(2.25")	1 0041	Top Binder Mix			/SQ YD	
HMA POLICY OVERLAY SHLD	(3.75")		Shoulder Mix	3.76	\$15.12	/SQ YD	• ·
CLASS A PAVEMENT PATCHING					\$195.00	/SO VD	
CLASS B PAVEMENT PATCHING					\$150.00		
CLASS C SHOULDER PATCHING					\$145.00		
PARTIAL DEPTH PVMT PATCH (M PARTIAL DEPTH PVMT PATCH (M)	Surface Mix Surface Mix	1.80 1.50	\$79.54 \$79.54	/ SQ YD / SQ YD	
LONGITUDINAL SHOULDER JOINT	ROUT & SEA!				¢2 nn	/LIN FT	
CENTERLINE JOINT ROUT & SEAL	, a dens					/LIN FT	
REFLECTIVE TRANSVERSE CRACK				7	\$2.00	/ LIN FT	
RANDOM CRACK ROUT & SEAL	(100% Re	hab = 100.00	'/ Station / Lane)		\$2.00	/ LIN FT	

FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

		STA	INDARD DES	IGN				
MAINTENANCE COSTS:	ITEM		%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5	LONG OUR DUTTER							
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	DIA/E	0.10%	16	SQ YD	\$82.72	\$1,324	*********************
		PWFn =	0.8626		PW =	0.8626	X \$41,700	\$35,971
YEAR 10	1							
·	LONG SHLD JT R&S		100.00%	3,920	LINFT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.50%	78	SQ YD	\$82.72	\$6,452	
		PWFn =	0.7441		PW =	0.7441	X \$46,828	\$34,844
YEAR 15	1						· ·	
LEAR 19	MILL PVMT & SHLD 2.00"		100.00%	17 422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L	2.00"	1.00%		SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	,	100.00%		SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "		100.00%		SQ YD	\$8.06	\$14,049	
		PWFn≃	0.6419	1,1 72	PW =	0.6419		\$179,062
L 1/54 D	Ţ~:	~~~						
YEAR 20	LONG SHLD JT R&S		100.000/	2.000	116)	62.00	67.040	
	CNTR LINE JOINT R&S		100.00%		LINFT	\$2.00	\$7,840	
	RNDM / THRM CRACK R&S		100.00%		LIN FT	\$2.00	\$19,600	
	PD PVMT PATCH M&F SURF		50.00%		LIN FT	\$2.00	\$12,936	
	FD FVM1 FATCH W&F SURF	PWFn =	0.10%	16	SQ YD PW =	\$82.72 0.5537	\$1,324 X \$41,700	\$23,088
			0.5551		F VV	0.0001	X 941,700	423,000
YEAR 25								
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	Ph.) 4 (m)	0.50%	78	SQ YD	\$82.72	\$6,452	
	HMA_\$D	PWFn =	0.4776		PW =	0.4776	X \$46,828	\$22,365
YEAR 30	INTERSTATE						· ·	
	MILL PVMT ONLY 2.00"		100.00%	15,680	SO YO	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L	2.00*	2.00%		SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF	2.00"	1.00%		SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3,75 "		100.00%	15,680		\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "		100.00%		SQ YD	\$7.06	\$12,293	
	:	PWFn =	0.4120		PW =	0.4120		\$176,594
\C. C. C		****						
YEAR 35	LONG SHLD JT R&S		1በበ በበማ	2 020	LINET	\$2 NA	\$7.040	
	CNTR LINE JOINT R&S		100.00%		LINET	\$2.00	\$7,840	
	RNDM / THRM CRACK R&S		100.00%		LINET	\$2.00	\$19,600	
	PD PVMT PATCH M&F SURF		50.00%		LIN FT SQ YD	\$2.00	\$12,936	
	PERMITATOR WAT SUKE	PWFn =	0.10% 0.3554	16	<u>SQ YD</u> PW =	\$82.72 0.3554	\$1,324 X \$41,700	\$14,819
			0.5554			U.UUU-1 .		ψ1+,019
YEAR 40								
	LONG SHLD JT R&S		100.00%		LINFT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LINFT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	DWE	0.50%	78	SQ YD	\$82.72	\$6,452	\$44.0FF
		PWFn =	0.3066		PW =	0.3066	X \$46,828	\$14,355
								\$501,098
						•		
	ROUTINE MAINTENANCE ACT	IVITY		2.23	Lane Miles		\$0	\$0
Габ	YEAR LIFE CYCLE	CRFn = 0.0407	252	2.4.4		ENANCE LIFE		\$501,098 \$55,056
<u> </u>	, « CEII E O I OLL	ON 11 - 0.0407	UJZ	ĮVI <i>F</i>	THE PROPERTY OF	CE ANNUAL CO	DOT FEW MILE	\$55,056

LIFE-CYCL	E COST ANALYSIS	: NEW DESIGN Calcu	ulated / Revised :	9/23/14 8:02 AM	
			JPCP	HMA	
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$1,505,528	\$1,433,167	
		ANNUAL COST PER MILE	\$165,413	\$157,462	
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$311,949	\$501,098	
		ANNUAL COST PER MILE	\$34,274	\$55,056	
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,817,477	\$1,934,265	
		ANNUAL COST PER MILE	\$199,687	\$212,518	
LIFE-CYCL	E COST ANALYSIS	FINAL SUMMARY			
LOWEST COST OPT	ION ========		JPCP	\$199,687	
OTHER OPTIONS (L	OWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[I-290 at I-90_94 Ramps_CD Roads-IDOT Mechanistic.xlsm]LifeCycle

IDOT MECHANISTIC PAVEMENT DESIGN BDE 5401 Template (Rev. 09/05/2013) Printed: 08/26/2019 PROJECT AND TRAFFIC INPUTS (Enter Data in Gray Shaded Cells) Route: All interchange ramps and C-D Roads Comments: Circle Interchange Project Contract 62A76 & 62A77 Section: 2015-019R Ramp ES/Taylor St. controls design for all ramps per BDE Figure 54-1.B County: Cook Design Date: 08/02/2019 ONP <-- BY Location: Circle Interchange Modify Date: <-- BY ADT Year Current: 43,900 2012 Facility Type Interstate or Freeway ** Ramp Design Fig. 54-1.B ** Future: 43,900 2040 # of Lanes = 1 Lane Ramp Crossroad? Interstate or Freeway # of Lanes = 6 or more Structural Design Traffic Rural or Urban? Rural Minimum Actual Actual %of % of ADT in Design Lane Road Class: 1 ADT ADT **Total ADT** P = PV= 39,510 90.0% 100% 0 Subgrade Support Rating (SSR): 500 Poor SU = 1,537 3.5% S = 100% Construction Year: 2020 MU = 1500 2,854 6.5% M = 100% Design Period (DP) = Struct. Design ADT = 43,900 (2030) 20 years

TRAFFIC FACTOR CALCULATION

		IKAFFIC F	ACTUR GAI	CULATION			
FLEXIBLE PAVEMENT		RAMP DESIGN MIN		RIGID	RAMP DESIGN MIN		
Cpv =	0.15	0.15	20%	Cpv =	0.15	0.15	20%
Csu =	132.5	132.5	40%	Csu =	143.81	143.81	40%
Cmu =	482.53	482.53	40%	Cmu =	696.42	696.42	40%
TF flexible (Actual) =	31.73	(Actual ADT)	6.32	TF rigid (Actual) =	44.28	(Actual ADT)	8.93
TF flexible (Min) =	6.32	(Min ADT Fig. 54-2	2.C)	TF rigid (Min) =	8.93	(Min ADT Fig.	54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS							
Full-Depth HMA Pavement	JPC Pavement						
Use TF flexible = 31.73 PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 44.28 Edge Support = Tied Shoulder or C.&G.						
Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C) Design HMA Mixture Modulus (E _{HMA}) = 710 ksi (Fig. 54-5.D)	Rigid Pavt Thick. = 11.00 in. (Fig. 54-4.E)						
Design HMA Strain (ε_{HMA}) = 45 (Fig. 54-5.E)	CRC Pavement						
Full Depth HMA Design Thickness = 14.75 in. (Fig. 54-5.F) Goto Map Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 44.28 IBR value = 3						
Use Full-Depth HMA Thickness = 14.75 inches	CRCP Thickness = 11.00 in. (Fig. 54-4.M)						

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS					
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay				
Use TF flexible = 31.73 HMA Overlay Design Thickness = 12.50 in. (Fig. 54-5.U) Goto Map Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.				
Use HMA Overlay Thickness = 10.75 inches	JPCP Thickness = NA inches				

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more One-way Streets with ADT > 3500	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)

	Min. Str.	Design Traffic (Fig	54-2.C)
Facility Type	PV	SU*	MU*
Interstate or Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	0	250	750

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients				
	Rigid (Fìg. 54-4.C)	Flexible (Fig. 54-5.B)		
Class	Csu	Cmu	Csu	Cmu	
	143.81	696.42	132.50	482.53	
11	135.78	567.21	112.06	385.44	
111	129.58	562.47	109.14	384.35	
IV	129.58	562.47	109.14	384.35	

Class Table for				
One-Way Streets				
ADT Class				
0 - 3500	II.			
>3501	1			

Class Table for					
2 or 3 lanes					
(not future 4 lane &					
not one-v	way street)				
ADT	Class				
0 - 749	IV				
750 - 2000					
>2000	II.				

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					54-2.B)
		Urban				
Number of Lanes	Р	S	₽	S	M	
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

FULL-DEPTH HMA	<u>PAVEMENT</u>					
ROUTE	1-290	Mainline near Morgan St				
SECTION COUNTY		2013-012R				•
LOCATION		Cook Circle Interchange				-
FACILITY TYPE		INTERSTATE				•
PROJECT LENGTH		1960	FT ==:	. 037	Miles	
# OF CENTERLINES			CL	0.37	Miles	
# OF LANES			LANES			
# OF EDGES			EP			
LANE WIDTH - AVERAGE SHOULDER WIDTH	HMA Left		FT			
011004221(111011)	HMA Right		FT			
	Total Width of Paved Shou	ılders 8	FT			
PAVEMENT THICKNESS (ELEVIRLE)	14.50	IM	44.75	IN MAX	
SHOULDER THICKNESS	restible;	8.00			Standard	Design
POLICY OVERLAY THICKN	ESS	3.75	IN	•••		
FLEX PAVEMENT TRAF	FIC FACTORS	MINIMUM 5.85		ACTUAL 26.89		USE 26.89
				•	•	Read Me
HMA COST PER TON	della cata della della compensa della socia della.		vitaniani properti	UNIT PRICE	esamenta eratua	
HMA SURFACE				\$113.60		
HMA TOP BINDER HMA LOWER BINDER				\$96.95 \$65.35		
HMA BINDER (LEVELING)		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		\$96.95		
HMA SHOULDER	wk-westerness commenters commente			\$72.00	/TON	through the commend or the code
	•			:		
INITIAL COSTS	THICKNESS	100% QUANTITY	LIMIT	LINET DDICE		COST
I I CIVI	ITIICKNESS	100% QUANTITY	UNII	UNIT PRICE		COST
HMA PAVEMENT (FULL-E	DEPTH) (14.50")	15,680	SQ YD '	\$62.63	/ SQ YD	\$982,038
HMA SURFACE COURSE	(2.00")	1,760	TONS .	\$113.60	/TON	\$0
HMA TOP BINDER COURSI	E (2.25")	1,990	TONS	\$96.95	/TON	\$0
HMA LOWER BINDER COU	RSE (10.25")	9,196	TONS	\$65.35	/ TON	\$0
			·		-destablishment	
HMA SHOULDER	(8.00")	with the state of the first of the state of	TONS	\$72.00		\$56,197
CURB & GUTTER		O.	LIN FT	\$30.00	/LIN FT	\$0
SUBBASE GRAN MATL TY	C (TONS)	606	TONS	\$25.00	/TON	\$15,150
IMPROVED SUBGRADE:	Aggregate	Walle # 8 E At 18,166	SQ YD	\$7.00	/ SQ YD	\$127,162
Reserved For User Supplie	d Item	0	UNITS	\$0.00	/ UNITS	\$0
Reserved For User Supplie			UNITS		/UNITS	\$0
PAVEMENT REMOVAL		45.000	50.10	645.00		#00E 000
SHOULDER REMOVAL		15,680 1,742		\$10.00	/ SQ YD	\$235,200 \$17,420
Note: * Denotes User Supp		FLEXIBLE CON: EXIBLE CONSTRUCTION.		ON INITIAL COST		\$1,433,167 \$157,462
	, ,	LEXIDEL CONSTITUTION	MINOAL	COSTTENUEL		\$107,402
MAINTENANCE COSTS:	THICKNESS	MATERIAL		LINIT COST		
ITEM	THICKNESS	MATERIAL		UNIT COST		
ROUTINE MAINTENANCE A	CTIVITY			\$0.00	LANE-MILE	/YEAR
HMA OVERLAY PVMT SUR	RF (2.00")	Surface Mix	9 3 4 5 4 5 4 5 4 5 4 5 4 5 4 5 4 5 4 5 4	\$12.75	/ SQ YD	
HMA OVERLAY PVMT	(3.75")	(144)	3,74		/SQ YD	
HMA SURFACE MIX	(1.50")	Surface Mix			/SQ YD	
HMA BINDER MIX HMA OVERLAY SHLD	(2.25") (Year 30) (1.75")	Top Binder Mix Shoulder Mix			/SQ YD	
HMA OVERLAY SHLD	(2.00")	Shoulder Mix			/SQ YD	
MILLING (2.00 IN)			10.00	\$3.00	/SQ YD	
, i						
PARTIAL DEPTH PVMT PA	, ,	Surface Mix			/ SQ YD	
PARTIAL DEPTH SHLD PA	ATCH (Mill & Fill Surf)	Shoulder Mix	2.00	\$78.06	/SQ YD	
PARTIAL DEPTH PVMT PA	,	Leveling Binder Mix			/ SQ YD	
PARTIAL DEPTH SHLD PA	TCH (Mill & Fill +2.00 *)	Shoulder Mix	2.03	\$78.06	/ SQ YD	
LONGITUDINAL SHOULDER	R JOINT ROUT & SEAL			\$2.00	/LIN FT	
CENTERLINE JOINT ROUT	& SEAL		•	\$2.00	/LINFT	
RANDOM / THERMAL CRAC	A ROUT & SEAL	(100% Rehab = 110,00 / Stati	on / Lane)	\$2.00	/ LIN FT	

FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	0/	OUANTITY	LINUT	UNIT COST	COST	PRESENT
WAINTENANCE COSTS.	I I CIVI	70	QUANTITY	OIVII	GIVIT COST	CO31	WORTH
YEAR S							
	LONG SHLD JT R&S	100.00%	.,	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S RNDM / THRM CRACK R&S	100.00% 50.00%		LIN FT LIN FT	\$2.00 \$2.00	\$19,600 \$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16		\$2.00 \$82.72	\$1,324	
	PWFn=	0.8626	10	PW =	0.8626 X	\$41,700	\$35,971
YEAR 1	LONG SHLD JT R&S	100.00%	2.000	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 1	5	***********					
	MILL PVMT & SHLD 2.00"	100.00%		SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%		SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00" HMA OVERLAY SHLD 2.00 "	100.00%		SQ YD	\$12.75	\$199,962	
	PWFn =	100.00% 0.6419	1,742	SQ YD PW =	\$8.06 0.6419 X	\$14,049 \$278,972	\$179,062
							4.1.0,00 2
YEAR 2	0 LONG SHLD JT R&S	400.000	0.000	1 13 1 127	60.00	67.040	
	CNTR LINE JOINT R&S	100.00% 100.00%		LIN FT LIN FT	\$2.00 \$2.00	\$7,840 \$19,600	
	RNDM / THRM CRACK R&S	50.00%		LINFT	\$2.00 \$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10%		SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 2	5					· ·	
	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%		LINFT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF PWFn =	0.50% 0.4776	78	SQ YD PW =	\$82.72 0,4776 X	\$6,452 \$46,828	\$22,365
	HMA_SD	0.4110		, ,, –	0.4770 7	Q 40,020	V LL,000
YEAR 3							
	MILL PVMT ONLY 2.00"	100.00%		SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00" PD SHLD PATCH M&F SURF 2.00"	2.00% 1.00%		SQ YD SQ YD	\$80.86 \$78.06	\$25,390 \$1,327	
	HMA OVERLAY PVMT 3.75"	100.00%		SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%		SQ YD	\$7.06	\$12,293	
	PWFn =	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 3	51	•					
L	LONG SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S	50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.10% 0.3554	16	SQ YD PW =	\$82.72 0.3554 X	\$1,324] \$41,700	\$14,819
	FWI II -	0.0004		- ** -	0.0004 X	φ41,700	φ14,015
YEAR 4							
	LONG SHLD JT R&S CNTR LINE JOINT R&S	100.00% 100.00%		LIN FT LIN FT	\$2.00 \$2.00	\$7,840 \$19,600	
	RNDM / THRM CRACK R&S	50.00%		LINFT	\$2.00 \$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	0.50%		SQ YD	\$82.72	\$6,452	
	PWFn =	0.3066		PW =	0.3066 X		\$14,355
						<u> </u>	\$501,098
				•			
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	: 0.00 FENANCE LIFE-C	\$0	\$0
4	5 YEAR LIFE CYCLE CRFn = 0.040	7852	M		CE ANNUAL COS		\$501,098 \$55,056

JPCP

PCC PAVEMENT ROUTE 1-290 Mainline near Morgan St SECTION 2013-012R COUNTY Cook LOCATION Circle Interchange **FACILITY TYPE** INTERSTATE PROJECT LENGTH 1960 FT ==> 0.37 Miles # OF CENTERLINES 5 CL # OF LANES 6 LANES # OF EDGES 2 EP LANE WIDTH - AVERAGE 12 FT SHOULDER WIDTH PCC Left 4 FT PCC Right 4 FT Total Width of Paved Shoulders 8 FT PAVEMENT THICKNESS (RIGID) **JPCP** TIED SHLD 11.00 IN SHOULDER THICKNESS 11.00 IN POLICY OVERLAY THICKNESS 3.75 IN RIGID PAVEMENT TRAFFIC FACTORS MINIMUM USE ACTUAL 37.44 37.44 8.26 Worksheet Construction Type is Reconstruction The Pavement Type is **JPCP INITIAL COSTS** THICKNESS 100% QUANTITY UNIT **UNIT PRICE** COST ITEM JPC PAVEMENT (11.00") 15,680 SQ YD \$47.42 / SQ YD \$743,546 PAVEMENT REINFORCEMENT \$22.00 / SQ YD 0 SQYD \$0 STABILIZED SUBBASE (4.00") \$310,327 16,333 SQ YD \$19.00 / SQ YD PCC SHOULDERS 1,742 SQ YD \$40.00 / SQ YD \$69,680 **CURB & GUTTER** 0 LIN FT \$30.00 / LIN FT \$0 SUBBASE GRAN MATL TY C (~1.72°) \$5,875 235 TONS \$25.00 /TON IMPROVED SUBGRADE: Aggregate ##### & 1 0 17,640 SQ YD \$7.00 / SQ YD \$123,480 Reserved For User Supplied Item 0 UNITS \$0.00 / UNITS \$0 Reserved For User Supplied Item \$0 0 UNITS \$0.00 /UNITS PAVEMENT REMOVAL 15,680 SQ YD \$15.00 / SQ YD \$235,200 SHOULDER REMOVAL 1,742 SQ YD \$10.00 / SQ YD \$17,420 Note: * Denotes User Supplied Quantity RIGID CONSTRUCTION INITIAL COST \$1,505,528 RIGID CONSTRUCTION ANNUAL COST PER MILE \$165,413 MAINTENANCE COSTS:

ITEM	THICKNESS		MATERIAL	17	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY					\$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(3.75")			5.75	: .	
HMA POLICY OVERLAY PVMT	(3.75")	1,6663		9.75	\$21.85	:/SQYD
HMA SURFACE MIX	(1.50")	1,000.17	Surface Mix	3.350	\$9.56	/ SQ YD
HMA BINDER MIX	(2.25")	1,0065	Top Binder Mix	15,1245	\$12.29	/ SQ YD
HMA POLICY OVERLAY SHLD	(3.75")		Shoulder Mix	9,75	\$15.12	/ SQ YD
CLASS A PAVEMENT PATCHING CLASS B PAVEMENT PATCHING CLASS C SHOULDER PATCHING	:				\$195.00 \$150.00 \$145.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & PARTIAL DEPTH PVMT PATCH (Mill &	,)	Surface Mix Surface Mix	1.89 1.80	\$79.54 \$79.54	/ SQ YD / SQ YD
LONGITUDINAL SHOULDER JOINT RO CENTERLINE JOINT ROUT & SEAL REFLECTIVE TRANSVERSE CRACK RO RANDOM CRACK ROUT & SEAL	OUT & SEAL	hab = 100.00	0° / Station / Lane)		\$2.00 \$2.00	/ LIN FT / LIN FT / LIN FT / LIN FT

JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 1		0.4007	40	CO VD	\$150.00			
	PAVEMENT PATCH CLASS B PWFn =	0.10% 0.7441	10	SQ YD PW =	0.7441	Υ	\$2,400 \$2,400	\$1,786
	: ******	0.7441		. ** -	0.7441	Α	Ψ2,400	Ψι,τασ
YEAR 1	5							
	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00		\$4,650	
	PWFn =	0.6419		PW =	0.6419	Х	\$4,650	\$2,985
YEAR 2	01				·			
	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00		\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00		\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00		\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00		\$19,600	
	PWFn =	0.5537		PW ≃	0.5537	Х	\$75,845	\$41,994
YEAR 2	25							
	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00		\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00		\$2,465	
	PWFn =	0.4776		PW =	0.4776	X	\$72,965	\$34,848
YEAR 3	0 INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	627	SQ YD	\$150,00		\$94,050	
	SHOULDER PATCH CLASS C	1.50%		SQYD	\$145.00		\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%		SQ YD	\$21.85	5	342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%		SQ YD	\$15.12		\$26,342	
	PWFn =	0.4120		PW =	0.4120	X S	466,753	\$192,296
YEAR 3	5 INTERSTATE		·····					
LILAN	LONGITUDINAL SHLD JT R&S	100.00%	3 920	LIN FT	\$2.00		\$7,840	
	CENTERLINE JT R&S	100.00%		LINFT	\$2.00		\$19,600	
	RANDOM CRACK R&S	50.00%		LIN FT	\$2.00		\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%		LINFT	\$2.00		\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%		SQYD	\$79.54		\$1,273	
	PWFn =	0.3554		PW =	0.3554	Х	\$48,019	\$17,065
YEAR 4	0 INTERSTATE							
12717 4	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00		\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%		LINFT	\$2.00		\$7,840	
	CENTERLINE JT R&S	100.00%		LINFT	\$2.00		\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	,	LINFT	\$2.00		\$11,318	
	RANDOM CRACK R&S	50.00%	,	LIN FT	\$2.00		\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%		SQ YD	\$79.54		\$6,204	
	PWFn =	0.3066		PW =	0.3066	X	\$68,422	\$20,975
		4.2230						\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2 23	Lane Mile:	\$0.00		\$0	\$0
	1200 HIAS INVINITENTINOS VOTIALIT		2.23		TENANCE LIFE	E-CVC		\$311,949
4	5 YEAR LIFE CYCLE CRFn = 0.040	7852	M		CE ANNUAL C			\$34,274

LIFE-CYCL	E COST ANA	LYSIS: NEW DESIGN ca	alculated / Revised :	9/23/14 8:02 AM	
			JPCP	НМА	
CONSTRUCTION	INITIAL COST	PRESENT WORTH		\$1,433,167	
		ANNUAL COST PER MILE	\$165,413	\$157,462	
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	l \$311,949	\$501,098	
		ANNUAL COST PER MILE	•	\$55,056	
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,817,477	\$1,934,265	
		ANNUAL COST PER MILE		\$212,518	
LIFE-CYCL	E COST ANA	LYSIS: FINAL SUMMARY			
LOWEST COST OPT	TION	=======================================	JPCP	\$199,687	
OTHER OPTIONS (L	OWEST TO HIGHEST):	TYPE / PERCENTAGE	нма	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[I-290 at I-90_94 Ramps_CD Roads-IDOT Mechanistic.xlsm]LifeCycle

Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 4.27 PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R) Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C) Design HMA Mixture Modulus (E _{HMA}) = 710 ksi (Fig. 54-5.D)	Use TF rigid = 5.83 Edge Support = Tied Shoulder or C.&G. Rigid Pavt Thick. = 9.25 in. (Fig. 54-4.E)
Design HMA Strain (ε _{HMA}) = 79 (Fig. 54-5.Ε)	CRC Pavement
Goto Map Full Depth HMA Design Thickness = 10.50 in. (Fig. 54-5.F) Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 5.83 IBR value = 3
Use Full-Depth HMA Thickness = 10.50 inches	CRCP Thickness = 8.25 in. (Fig. 54-4.M)
	TF MUST BE > 60 FOR CRCP

112.06

385.44

(Min ADT Fig. 54-2.C)

(Actual ADT)

50%

50%

3.17

Csu =

Cmu =

TF rigid (Actual) =

TF rigid (Min) =

143.81

696.42

5.83

4.59

135.78

567.21

(Actual ADT)

(Min ADT Fig. 54-2.C)

50%

50%

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEN	IENT DESIGN CALCULATIONS
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 4.27 HMA Overlay Design Thickness = 7.75 in. (Fig. 54-5.U) Goto Map Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.
Use HMA Overlay Thickness = 7.75 inches	JPCP Thickness = NA inches
	CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES	FROM BUE MANUAL CHAPTER 5	<u> 4 - PAVEMENT DESIGN</u>	
Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more One-way Streets with ADT > 3500	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)

Min. Str. Design Traffic (Fig 54-2.C)					
PV	SU*	MU.			
0	500	1500			
0	250	750			
0	250	750			
	PV 0 0	PV SU* 0 500 0 250			

Csu =

Cmu =

TF flexible (Actual) =

TF flexible (Min) =

132.5

482.53

4.27

3.17

Class Table for One-Way Streets				
ADT	Class			
0 - 3500	II			
>3501	I			

		, , , , , , , , , , , , , , , , , , ,			
		Traffic Factor ESAL	Coefficients		
	Rigid	Fig. 54-4.C)	Flexible (Fig. 54-5.B		
Class	Csu	Cmu	Csu	Cmu	
	143.81	696.42	132.50	482.53	
II	135.78	567.21	112.06	385.44	
III	129.58	562.47	109,14	384.35	
IV	129.58	562.47	109.14	384.35	

Class Table for						
2 or 3 lanes						
(not future 4 lane &						
	vay street)					
ADT	Class					
0 - 749	IV					
750 - 2000						
750 - 2000 III >2000 II						

	Design La	ne Distribution F	uctural Design Traffic (Fig. 54-2.B)			
		Rurai			Urban	
Number of Lanes	P	S	M	P	S	М
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

2017							
ROUTE SECTION	I-290	Mainline ne	ar Morgan S 2013-012F				
COUNTY			Cool				
LOCATION		Circle	Interchange	•			
FACILITY TYPE		1	INTERSTATE	•			
PROJECT LENGTH) FT ==>	• 0.3	37 Miles	
# OF CENTERLINES # OF LANES				S CL			
# OF EDGES				LANES LEP			
LANE WIDTH - AVERAGE				FT			
SHOULDER WIDTH HMA Left				FT			
HMA Right			4	FT			
Total Width of Pav	ed Shou	Iders	8	FT			
PAVEMENT THICKNESS (FLEXIBLE)			14.50	1.41	14	75 IN MAX	
SHOULDER THICKNESS			8.00			Standar	
POLICY OVERLAY THICKNESS			3.75				
FLEX PAVEMENT TRAFFIC FACTORS				-			
FLEX PAVEMENT TRAFFIC FACTORS			MINIMUM 5.85		ACTU		USE
			3.03	•	26.	03	26.89
HMA COST PER TON	vitos mon.		Garani ere ireiniere	eroene estatopolo	LIME DOL		Read Met
HMA SURFACE					UNIT PRI		· · · · · · · · · · · · · · · · · · ·
HMA TOP BINDER						0 /TON 05 /TON	
HMA LOWER BINDER						5 / TON	
HMA BINDER (LEVELING)						5 /TON	
HMA SHOULDER	***************************************		-tudopoposayayaya	emmentalistis (*)	\$72.0	0 /TON	
					-		
INITIAL COSTS							
ITEM THICK	KNESS	1009	% QUANTITY	UNIT	UNIT PRI	E	COST
HMA PAVEMENT (FULL-DEPTH) (1	4.50")	19835	15,680	SQ YD *	\$62.6	3 /SQ YD	\$982,038 ~
HMA SURFACE COURSE (2.00")	- 1949 s	4 750	TONE		0 12001	ro.
```	2.25")	1.000	1,760 1,990			0 / TON 5 / TON	\$0 \$0
	D.25" )	_ : <u> </u>	9,196			5 / TON	\$0
	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	American Services Control 11		SEARS CONTRACTOR	finnstrummerssssssmallaussgungan
HMA SHOULDER	8.00")		704	***************************************	P70 0	0 (	<b>7</b> -0.407
CURB & GUTTER	0.00 ]	andrete a service de la constantina de La constantina de la		TONS		0 /TON D /LIN FT	\$56,197 - \$0
					400.0	D. , LIIV . ,	Ψ
SUBBASE GRAN MATL TY C (TONS) IMPROVED SUBGRADE: Add				TONS		0 /TON	\$15,150
IMPROVED SUBGRADE: Agg	regate	Vid n # St 4"	18,166	SQ YD	\$7.0	0 /SQYD	\$127,162
Reserved For User Supplied Item			0	UNITS	\$0.0	0 /UNITS	\$0
Reserved For User Supplied Item			0	UNITS	\$0.0	0 /UNITS	\$0
PAVEMENT REMOVAL			15,680	SO YO	\$15.0	0 /SQYD	\$235,200
SHOULDER REMOVAL			1,742			0 /SQYD	\$17,420
Makes & December Uses County of County		· · · · ·					
Note: * Denotes User Supplied Quantity	EI F				N INITIAL COS COST PER MI		\$1,433,167 \$157,462
				- ANTONE C	JOST 1 LICIVILE	-1	\$107,102
MAINTENANCE COSTS: ITEM THICK	NESS		MATERIAL	Ŧ	LIMIT COS	·-	
THO.	MEGG		MATERIAL	<u>:</u>	UNIT COS	<u> </u>	
ROUTINE MAINTENANCE ACTIVITY					\$0.0	0 LANE-MIL	E/YEAR
HMA OVERLAY PVMT SURF (	2.00")	1.24.3		,	***	<b>.</b>	
	3.75")	1000	Surface Mix	0:50 3:55		5 /SQYD 5 /SQYD	
1	1.50")	1.0011	Surface Mix	1.55		6 /SQYD	
	2.25")	1.0003	Top Binder Mix	2.03		9 /SQYD	
	1.75")		Shoulder Mix			6 /SQYD	
HMA OVERLAY SHLD (	2.00")		Shoulder Mix	2.53	\$8.0	6 / \$Q YD	
MILLING (2.00 IN)				0.00	\$3.0	0 /SQYD	
DADTIAL DEPTH DIALE DAMON			1.				
PARTIAL DEPTH PVMT PATCH (Mill & F. PARTIAL DEPTH SHLD PATCH (Mill & F.			Surface Mix	1.00		2 /SQYD	
(Mill of F			Shoulder Mix		\$16.U	6 /SQYD	
PARTIAL DEPTH PVMT PATCH (Mill & Fill)	+2.00 *)	Leve	ling Binder Mix	2.00	\$80.8	6 /SQYD	
PARTIAL DEPTH SHLD PATCH (Mill & FILL)	+2.00 "}		Shoulder Mix	2.3%		6 /SQYD	
LONGITUDINAL SHOULDER JOINT ROUT & SI	FAI				eo n	: Oznace	
CENTERLINE JOINT ROUT & SEAL						0 /LINFT 0 /LINFT	
RANDOM / THERMAL CRACK ROUT & SEAL	t	100% Rehab	= 110,00' / Static	on/Lane)		D /LINFT	
•	·			•			

#### FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

		STA	ANDARD DES	IGN				
MAINTENANCE COSTS:	ITEM		%	QUANTITY	/ UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5	;							
· · · · · · · · · · · · · · · · · · ·	LONG SHLD JT R&S		100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.10%	16	SQ YD	\$82.72	\$1,324	
		PWFn =	0.8626		PW =	0.8626 X	\$41,700	\$35,971
YEAR 1	01							
-	LONG SHLD JT R&S		100.00%	3,920	LINFT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.50%	78	SQ YD	\$82.72	\$6,452	
		PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 1	5							
	MILL PVMT & SHLD 2.00"		100.00%		SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L	. 2.00"	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"		100.00%		ŞQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "	DV41C-	100.00%	1,742	SQ YD	\$8.06	\$14,049	
		PWFn =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 2						***************************************		
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	PWFn=	0.10%	16	SQ YD	\$82,72	\$1,324	600.000
		F VV F 11 ==	0.5537		PW =	0.5537 X	\$41,700	\$23,088
YEAR 2			400.000					
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S PD PVMT PATCH M&F SURF		50.00%	-	LIN FT	\$2.00	\$12,936	
	PD PVMI PAICH WAF SURF	PWFn =	0.50%	/8	SQ YD PW =	\$82.72 0.4776 X	\$6,452 \$46,828	\$22,365
	HMA_\$D	* ****	0.4770		, ,, –	0.4770 X	. 440,020	Ψ22,303
YEAR 30								
	MILL PVMT ONLY 2.00"		100.00%		SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L		2.00%		SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF	2.00"	1.00%		SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75"		100.00%		SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75"	PWFn=	100.00%	1,742	SQ YD	\$7.06	\$12,293	0470 504
		PVVFN=	0.4120		PW =	0.4120 X	\$428,641	\$176,594
YEAR 35			100					,
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%	•	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	PWFn=	0.10% 0.3554	16	SQ YD PW =	\$82.72	\$1,324	614.010
		1 WVI 11 ***	0.0004		- 44 =	0.3554 X	\$41,700	\$14,819
YEAR 40	LONG SHLD JT R&S		100.000	2.000	1 1k) ==	<b>20.00</b>	ft7.040	
	CNTR LINE JOINT R&S		100.00% 100.00%		LIN FT LIN FT	\$2.00	\$7,840	
	I N					\$2.00	\$19,600	
	RNDM / THRM CRACK R&S PD PVMT PATCH M&F SURF		50.00% 0.50%		LIN FT SQ YD	\$2.00 \$82.72	\$12,936 \$6,452	
	C 1 AMELIATOR MICE SOLVE	PWFn ≂	0.30%		PW =	0.3066 X		\$14,355
				•				\$501,098
	ROUTINE MAINTENANCE ACT	'IVITY	·	2.23	Lane Miles	0.00	\$0	\$0
—: <u>:</u>	TVE+D1155 0000 -					ENANCE LIFE-C		\$501,098
45	YEAR LIFE CYCLE	CRFn = 0.0407	<b>'</b> 852	M/	AINTENAN	CE ANNUAL COS	ST PER MILE	\$55,056

**JPCP** 

**PCC PAVEMENT** ROUTE 1-290 Mainline near Morgan St SECTION 2013-012R COUNTY Cook LOCATION Circle Interchange **FACILITY TYPE** INTERSTATE PROJECT LENGTH 1960 FT ==> 0.37 Miles # OF CENTERLINES 5 CL # OF LANES 6 LANES # OF EDGES 2 EP LANE WIDTH - AVERAGE 12 FT SHOULDER WIDTH PCC Left 4 FT PCC Right 4 FT Total Width of Paved Shoulders 8 FT PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD SHOULDER THICKNESS 11.00 IN POLICY OVERLAY THICKNESS 3.75 IN RIGID PAVEMENT TRAFFIC FACTORS MINIMUM ACTUAL UŞE 8.26 37.44 37.44 Worksheet Construction Type is Reconstruction The Pavement Type is **JPCP INITIAL COSTS** ITEM **THICKNESS** 100% QUANTITY UNIT **UNIT PRICE** COST JPC PAVEMENT (11.00")15.680 SQ YD \$47.42 / SQ YD \$743,546 PAVEMENT REINFORCEMENT 0 SQYD \$22.00 / SQ YD STABILIZED SUBBASE (4.00") 16,333 SQ YD \$19.00 / SQ YD \$310,327 PCC SHOULDERS 1,742 SQ YD \$40.00 / SQ YD \$69,680 **CURB & GUTTER** 0 LIN FT \$30.00 / LIN FT \$0 SUBBASE GRAN MATL TY C ~ [.72"] 235 TONS \$25.00 / TON \$5,875 IMPROVED SUBGRADE: Aggregate William Page 17,640 SQ YD \$7.00 / SQ YD \$123,480 Reserved For User Supplied Item 0 UNITS \$0.00 / UNITS \$0 Reserved For User Supplied Item 0 UNITS \$0.00 / LINES \$0 PAVEMENT REMOVAL 15,680 SQ YD \$15.00 / SQ YD \$235,200 SHOULDER REMOVAL 1,742 SQ YD \$10.00 / SQ YD \$17,420 Note: * Denotes User Supplied Quantity RIGID CONSTRUCTION INITIAL COST \$1,505,528 RIGID CONSTRUCTION ANNUAL COST PER MILE \$165,413 MAINTENANCE COSTS: ITEM **THICKNESS** MATERIAL **UNIT COST** ROUTINE MAINTENANCE ACTIVITY \$0.00 / LANE-MILE / YEAR HMA POLICY OVERLAY (3.75")HMA POLICY OVERLAY PVMT (3.75") \$21.85 / SQ YD HMA SURFACE MIX 1.50" ) Surface Mix \$9.56 / SQ YD HMA BINDER MIX 2.25" Top Binder Mix \$12.29 / SQ YD HMA POLICY OVERLAY SHLD (3.75") Shoulder Mix \$15.12 /SQYD CLASS A PAVEMENT PATCHING \$195.00 / SQ YD CLASS B PAVEMENT PATCHING \$150.00 /SQYD CLASS C SHOULDER PATCHING \$145.00 / SQ YD

PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)

LONGITUDINAL SHOULDER JOINT ROUT & SEAL

REFLECTIVE TRANSVERSE CRACK ROUT & SEAL

CENTERLINE JOINT ROUT & SEAL

RANDOM CRACK ROUT & SEAL

PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50")

Surface Mix

Surface Mix

(100% Rehab = 100.00" / Station / Lane)

\$79.54 / SQ YD

\$79.54 / SQ YD

\$2.00 / LIN FT

\$2.00 / LIN FT

\$2.00 / LIN FT

\$2.00 / INFT

#### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

							PRESENT
MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	WORTH
L VEAD 40					17171777		
YEAR 10	*						
	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn =	0.7441		PW =	0.7441	X \$2,400	\$1,786
YEAR 15	;[			**-			
	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn =		0.	PW =	0.6419		\$2,985
					0.0410	44,000	Ψ2,300
YEAR 20					•		
	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn =	0.5537		PW =	0.5537	X \$75,845	\$41,994
YEAR 25							
	PAVEMENT PATCH CLASS B	3,00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%		SQ YD	\$145.00	\$2,465	
	PWFn =	0.4776		PW ≂	0.4776		\$34,848
YEAR 30	INTERCTATE				***************************************		
L TEAR 30	INTERSTATE PAVEMENT PATCH CLASS B	4.000/	007	50.1/5	0450.00		
	SHOULDER PATCH CLASS C	4.00%		SQ YD	\$150.00	\$94,050	
	HMA POLICY OVERLAY 3.75" (PVMT)	1.50% 100.00%		SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%		SQ YD SQ YD	\$21.85 \$15.12	\$342,591	
	PWFn =	0.4120	1,142	PW =	0.4120	\$26,342 \$466,753	\$192,296
		0.4120		, ,, =	0.4120 /	ν φ400,755	\$152,250
YEAR 35							
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn =	0.3554		PW =	0.3554 >	\$48,019	\$17,065
YEAR 40	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%		LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%		LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%		LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%		LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn =	0.3066		PW =	0.3066 >		\$20,975
							\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2 23	Lane Miles	\$0.00	\$0	\$0
					ENANCE LIFE-		\$311,949
45	YEAR LIFE CYCLE CRFn = 0.040	7852	MA		E ANNUAL CO		\$34,274
							4

LIFE-CYCL	E COST ANALYSIS:	NEW DESIGN Calcu	lated / Revised :	9/23/14 8:02 AM	
CONSTRUCTION	INITIAL COST	PRESENT WORTH ANNUAL COST PER MILE	JPCP \$1,505,528 \$165,413	HMA \$1,433,167 \$157,462	
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH ANNUAL COST PER MILE	\$311,949 \$34,274	\$501,098 \$55,056	
TOTAL	LIFE-CYCLE COST	PRESENT WORTH ANNUAL COST PER MILE	\$1,817,477 \$199,687	\$1,934,265 \$212,518	
LIFE-CYCL	E COST ANALYSIS:	FINAL SUMMARY			
LOWEST COST OPT	ION ======		JPCP	\$199,687	
OTHER OPTIONS (LC	OWEST TO HIGHEST):	TYPE / PERCENTAGE	HMA	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[Lake St Ramp IDOT Mechanistic.xlsm]LifeCycleCost

Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 3.17 PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 4.59 Edge Support = Tied Shoulder or C.&G.
Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)  Design HMA Mixture Modulus (E _{HMA} ) = 710 ksi (Fig. 54-5.D)	Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)
Design HMA Strain (ε _{HMA} ) = 86 (Fig. 54-5.Ε)	CRC Pavement
Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)  Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 4.59 'IBR value = 3
Use Full-Depth HMA Thickness = 10.00 inches	CRCP Thickness = 8.00 in. (Fig. 54-4.M)
	TF MUST BE > 60 FOR CRCP

112.06

385.44

(Min ADT Fig. 54-2.C)

(Actual ADT)

50%

50%

3.17

Csu =

Cmu =

TF rigid (Actual) =

TF rigid (Min) =

143.81

696.42

1.88

4.59

135.78

567.21

(Actual ADT)

(Min ADT Fig. 54-2.C)

50%

50%

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS							
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay						
Use TF flexible = 3.17  HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)  Goto Map Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.						
Use HMA Overlay Thickness = 7.25 inches	JPCP Thickness = NA inches						

## CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN							
Class I Roads	Class II Roads	Class III Roads	Class IV Roads				
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)				

	Min. Str. Design Traffic (Fig 54-2.C)						
Facility Type	PV	SU*	MU.				
Interstate or Freeway	0	500	1500				
Other Marked State Route	0	250	750				
Unmarked State Route	0	250	750				

Csu =

Cmu =

TF flexible (Actual) =

TF flexible (Min) =

132.5

482.53

1.38

3.17

* Use marked route minimums for unmarked routes (Fig. 54-1.8)

	Traffic Factor ESAL Coefficients								
	Rigid (	Fig. 54-4.C)	Flexible (Fig. 54-5.8)						
Class	Csu	Cmu	Csu	Cmu					
	143.81	696.42	132.50	482.53					
11	135.78	567.21	112.06	385.44					
111	129.58	562.47	109.14	384.35					
IV	129.58	562.47	109.14	384.35					
				77-77-77					

Class Table for					
2 or 3	3 lanes				
(not futur	re 4 lane &				
	way street)				
ADT	Class				
0 - 749	IA				
750 - 2000	ll ll				
>2000	II.				

Class Table for One-Way Streets

Class

ADT

0 - 3500 >3501

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2 B)								
		Rural	Urban						
Number of Lanes	Р	S	M	P	S	М			
1 Lane Ramp	100%	100%	100%	100%	100%	100%			
2 or 3	50%	50%	50%	50%	50%	50%			
4	32%	45%	45%	32%	45%	45%			
6 or more	20%	40%	40%	8%	37%	37%			

## LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## **FULL-DEPTH HMA PAVEMENT**

Standard Design

							•
ROUTE SECTION	1-2	290 Mainline	near Morgan St				
COUNTY			2013-012R Cook				
LOCATION		Cir	cle Interchange				
FACILITY TYPE			INTERSTATE	•			
PROJECT LENGTH			1000	) FT ==:	0.27	Miles	
# OF CENTERLINES				CL	- 0.37	IVIIICS	
# OF LANES				LANES			
# OF EDGES LANE WIDTH - AVERAGE	:		and the second s	EP FT			
SHOULDER WIDTH	- HMA Left			FT			
	HMA Right			FT			
	Total Width of Paved SI	noulders		FT			
PAVEMENT THICKNESS	(FLEXIBLE)		14,50	IN.	14.75	IN MAX	<
SHOULDER THICKNESS			8.00				rd Design
POLICY OVERLAY THICK	NESS		3.75	i IN			
FLEX PAVEMENT TRA	FFIC FACTORS		MINIMUM		ACTUAL	_	USE
-			5.85		26.89		26.89
HMA COST PER TON	en de la Stanco en como de la colonida politica (especial).	vocasena uno turno		varrotastaasast	UNIT PRICE	MATERIAL STATE	Read Me
HMA SURFACE					\$113.60		
HMA TOP BINDER					\$96.95		
HMA LOWER BINDER HMA BINDER (LEVELING	•		* -		\$65.35		
HMA SHOULDER	•)				\$96.95 \$72.00		
Communication and the Communication of the Communic	e el esperante de la companya de la		latina est la del se comerce e como como como	***************************************		. <u>1.1211</u>	pasky waterskepistropiky, a jarky i rombine trop
INITIAL COSTS					•		
ITEM	THICKNES	SS 10	00% QUANTITY	UNIT	UNIT PRICE		COST
HMA PAVEMENT (FULL	-DEPTH) (14.50	<b>')</b>	15,680	SQ YD *	\$62.63	/ SQ YD	\$982,038
HMA SURFACE COURSE	( 2.00	<b>")</b> 1000	1,760	TONS	\$113.60	/ TON	\$0
HMA TOP BINDER COUR	SE (2.25		1,990		\$96.95		\$0
HMA LOWER BINDER CO	URSE (10.25	<u>')                                    </u>	9,196	TONS	\$65.35	/TON	\$0
HMA SHOULDER	( 8.00	')	781	TONS	\$72.00	/TON	\$56,197
CURB & GUTTER			0	LIN FT	\$30.00	/LIN FT	\$0
SUBBASE GRAN MATL TY	( C (TONS)		606	TONS	\$25.00	/TON	\$15,150
IMPROVED SUBGRADE:	, ,	te %##8 4.83				/SQ YD	\$127,162
Reserved For User Suppl	ied Item		0	UNITS	£0.00	440000	50
Reserved For User Suppl		· .		UNITS		/UNITS	\$0 \$0
DAYELELE DELANGE							•
PAVEMENT REMOVAL SHOULDER REMOVAL			15,680 1,742		\$15.00 \$10.00		\$235,200 \$17,420
			1,742	30 10	\$10.00	730 10	\$17,42U
Note: * Denotes User Sup					N INITIAL COST		\$1,433,167
		FLEXIBLE O	UNSTRUCTION	ANNUAL	COST PER MILE		\$157,462
MAINTENANCE COSTS:		_					
ІТЕМ	THICKNES	S	MATERIAL	!	UNIT COST		
ROUTINE MAINTENANCE	ACTIVITY				\$0.00	LANE-MIL	.E / YEAR
LINA OVERN AV DVAT DU	DE (0.00)				*		
HMA OVERLAY PVMT SU	RF (2.00' (3.75'		Surface Mix	2 pd 6,76		/SQ YD	
HMA SURFACE MIX	( 1.50'		Surface Mix	1.50		/SQ YD	
HMA BINDER MIX	(2.25		Top Binder Mix	3.30		/SQ YD	
HMA OVERLAY SHLD HMA OVERLAY SHLD	(Year 30) (1.75* (2.00*		Shoulder Mix Shoulder Mix	1.74. 21.223		I SQ YD I SQ YD	
MILLING (2.00 IN)				2.60	\$3.00		
					49.00	, 5G 1D	
PARTIAL DEPTH PVMT P			Surface Mix	A C11	\$82.72		
PARTIAL DEPTH SHLD P	'ATCH' (M/II&Fil) Su	n)	Shoulder Mix	J. EW	\$78.06	/ SQ YD	
PARTIAL DEPTH PVMT PA		") L	eveling Binder Mix	1. J. 2. 2. J. 2.	\$80.86	/ SQ YD	
PARTIAL DEPTH SHLD P			Shoulder Mix	2.00	\$78.06		
LONGITUDINAL SHOULDE	R JOINT ROUT & SEAL		100		<b>e</b> 2.00	/LIN FT	
CENTERLINE JOINT ROUT	T & SEAL					/LINFT	
RANDOM / THERMAL CRA	ICK ROUT & SEAL	(100% Reh	ab = 110,00° / Statio	on / Lane)		/LIN FT	
			100		general section		

#### FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

MAINTENANCE COSTS: ITEM		%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 5							
LONG SHLD JT R&S		100.00%	3 020	LIN FT	\$2.00	\$7,840	
CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
PD PVMT PATCH M&F SUF		0.10%		SQ YD	\$82.72	\$1,324	
	PWFn =	0.8626	**********	PW =	0.8626 ×		\$35,971
YEAR 10	***************************************			***			
LONG SHLD JT R&S	7-72-0-4	100.00%	3,920	LIN FT	\$2.00	\$7,840	
CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
RNDM / THRM CRACK R&S		50.00%	6,468	LIN FT	\$2.00	\$12,936	
PD PVMT PATCH M&F SUR		0.50%	78	SQ YD	\$82.72	\$6,452	
	PWFn =	0.7441		PW =	0.7441 X	\$46,828	\$34,844
YEAR 15	****						
MILL PVMT & SHLD 2.00"		100.00%	17,422	SQ YD	\$3.00	\$52,266	
PD PVMT PATCH M&F ADI		1.00%	157	SQ YD	\$80.86	\$12,695	
HMA OVERLAY PVMT 2.00"		100.00%		SQ YD	\$12.75	\$199,962	
HMA OVERLAY SHLD 2.00 *		100.00%	1,742	SQ YD	\$8.06	\$14,049	
	PWFn =	0.6419		PW =	0.6419 X	\$278,972	\$179,062
YEAR 20	*****						
LONG SHLD JT R&S		100.00%	3,920	LIN FT	\$2.00	\$7,840	
CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
RNDM / THRM CRACK R&S	_	50.00%		LIN FT	\$2.00	\$12,936	
PD PVMT PATCH M&F SUR		0.10%	16	SQ YD	\$82.72	\$1,324	
	PWFn =	0.5537		PW ≕	0.5537 X	\$41,700	\$23,088
YEAR 25			·				
LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
RNDM / THRM CRACK R&S PD PVMT PATCH M&F SUR	_	50.00%		LINFT	\$2.00	\$12,936	
FD FVWI FAICH WAF SUR	PWFn=	0.50% 0.4776	/8	SQ YD PW =	\$82.72 0.4776 X	\$6,452 \$46,828	600.005
HMA_SD	. ****	0.4170		- VV -	0.4770 X	φ <b>40,</b> 020	\$22,365
YEAR 30 INTERSTATE	7724				****		
MILL PVMT ONLY 2.00"		100.00%	15,680		\$3.00	\$47,040	
PD PVMT PATCH M&F ADD		2.00%		SQ YD	\$80.86	\$25,390	
PD SHLD PATCH M&F SUR		1.00%		SQ YD	\$78.06	\$1,327	
HMA OVERLAY PVMT 3.75 HMA OVERLAY SHLD 1.75		100.00%	15,680		\$21.85	\$342,591	
HIMA OVERLAT SALD 1.75	PWFn =	100.00% 0.4120	1,742	SQ YD PW =	\$7.06 0.4120 X	\$12,293 \$428,641	\$176,594
		0.4120			0.4120 X	φ420,041	\$170,094
YEAR 35 LONG SHLD JT R&S		400.0004	0.000		45.55		
CNTR LINE JOINT R&S		100.00% 100.00%	3,920		\$2.00	\$7,840	
RNDM / THRM CRACK R&S		50.00%	9,800 6,468		\$2.00	\$19,600	
PD PVMT PATCH M&F SURI	=	0.10%		SQ YD	\$2.00	\$12,936	
E STAMP TO THE COLUMN	PWFn =	0.3554	10	PW =	\$82.72 0.3554 X	\$1,324 \$41,700	\$14,819
YEAR 40							
LONG SHLD JT R&S		100.00%	2.000	1.461.000	62.00		
CNTR LINE JOINT R&S		100.00%	3,920 9,800		\$2.00 \$2.00	\$7,840	
RNDM / THRM CRACK R&S		50.00%	9,600 6,468		\$2.00 \$2.00	\$19,600 \$12,936	
PD PVMT PATCH M&F SURF	=	0.50%		SQ YD	\$2.00 \$82.72	\$6,452	
	PWFn≍	0.3066		PW =	0.3066 X	\$46,828	\$14,355
	6 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -						
							\$501,098
ROUTINE MAINTENANCE AC	TIVITY		2.23	Lane Miles	0.00	\$0	\$0
45 YEAR LIFE CYCLE	CDF+ - 0 C 107	250			ENANCE LIFE-C		\$501,098
[40] LEWY FILE CLOFE	CRFn = 0.0407	<b>002</b>	MA	INTENANC	E ANNUAL COS	IT PER MILE	\$55,056

ROUTE SECTION COUNTY LOCATION	<b>I-2</b> 9	0 Mainline n	ear Morgan S 2013-012 Coo e Interchang	R k			
FACILITY TYPE			INTERSTATI	E			
PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH PCC PCC Total Widt	Left Right th of Paved Sho	ulders	1. 1.	0 FT ==: 5 CL 6 LANES 2 EP 2 FT 4 FT 4 FT 8 FT	> 0.37	Miles	
PAVEMENT THICKNESS (RIGID) SHOULDER THICKNESS		JPCP	11.00 11.00		TIED SHLD		
POLICY OVERLAY THICKNESS			3.75	5 IN			
RIGID PAVEMENT TRAFFIC FACTO	ORS		MINIMUM	1	ACTUAL		USE
Worksheet Construction Type is	Reconstruction		8.26		37.44		37.44
	**COURSE GCEON			Ine Pa	avement Type is		JPCP
INITIAL COSTS ITEM	THICKNESS	100	% QUANTITY	r i ikii <del>n</del>	LINIT ODIOE		222-
			70 GOANTII I	OMIT	UNIT PRICE		COST
JPC PAVEMENT PAVEMENT REINFORCEMENT	( 11.00" )		15,680		\$47.42		\$743,546
STABILIZED SUBBASE	( 4.00" )		16,333	SQ YD SQ YD	\$22.00 \$19.00		\$0 \$310,327
PCC SHOULDERS CURB & GUTTER				SQ YD LIN FT	\$40.00 \$30.00	/SQ YD	\$69,680 \$0
SUBBASE GRAN MATL TY C IMPROVED SUBGRADE:	( ~ 1.72" ) Aggregate	Viidm = 310		TONS SQ YD	\$25.00		\$5,875 \$123,480
Reserved For User Supplied Item Reserved For User Supplied Item		•		UNITS	\$0.00 \$0.00	/ UNITS	\$0 \$0
PAVEMENT REMOVAL SHOULDER REMOVAL			15,680 1,742		\$15.00 \$10.00	/ SQ YD	\$235,200 \$17,420
Note: * Denotes User Supplied Quantit	ty	RIGID CON	RIGID CON	STRUCTIO ANNUAL O	N INITIAL COST COST PER MILE		\$1,505,528 \$165,413
MAINTENANCE COSTS: ITEM	THICKNESS		MATERIAL	1 <del>2</del> 2	UNIT COST		
ROUTINE MAINTENANCE ACTIVITY					\$0.00	/ LANE-MIL	E/YEAR
HMA POLICY OVERLAY	(3.75")			3.75			
HMA POLICY OVERLAY PVMT HMA SURFACE MIX	(3.75") (1.50")	1 (643	Surface Min	3.79	\$21.85		
HMA BINDER MIX	( 2.25" )	1,000 1 7 <u>1,</u> 000 5	Surface Mix Top Binder Mix	1,80 3,05	\$9.56 \$12.29		
HMA POLICY OVERLAY SHLD	(3.75")		Shoulder Mix	3.75	\$15.12		
CLASS A PAVEMENT PATCHING					\$195.00	SO YD	•
CLASS B PAVEMENT PATCHING CLASS C SHOULDER PATCHING					\$150.00	SQ YD	
· · · · · · · · · · · · · · · ·					\$145.00	'SQ YD	
PARTIAL DEPTH PVMT PATCH (Mill & PARTIAL DEPTH PVMT PATCH (Mill &	Fill HMA Surf) Fill HMA 1.50'	"	Surface Mix Surface Mix	1.80 1.80	\$79.54 / \$79.54 /		
LONGITUDINAL SHOULDER JOINT RO	UT & SEAL			:	\$2.00	LIN FT	
CENTERLINE JOINT ROUT & SEAL REFLECTIVE TRANSVERSE CRACK RO					\$2.00 /	LIN FT	
RANDOM CRACK ROUT & SEAL		hab = 100.00' /	Station / Lane)		\$2.00 / \$2.00 /		
					QZ.00 /	-H-1-1	

#### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

PRESI WO	COST	***	UNIT COST	UNIT	QUANTITY	%		ITEM	NANCE COSTS:
			<del></del>	***	****	<del></del>			YEAR 1
	\$2,400		\$150.00	SQ YD	16	0.10%		PAVEMENT PATCH CLASS B	
\$1.7	\$2,400	×	0.7441	PW =		0.7441	PWFn =		
Ψιμ	4_,.55							c 1	YEAR 1
									TEAR I
	\$4,650		\$150.00	SQ YD	31	0.20%		PAVEMENT PATCH CLASS B	
\$2,9	\$4,650	X	0.6419	PW =		0.6419	PWFn =		
								5	YEAR 2
	C47.400		\$150.00	SQ YD	314	2.00%		PAVEMENT PATCH CLASS B	****
	\$47,100		\$145.00	SQ YD		0.50%		SHOULDER PATCH CLASS C	
	\$1,305		\$143.00		3,920	100.00%		LONGITUDINAL SHLD JT R&S	
	\$7,840		\$2.00 \$2.00		9,800	100.00%		CENTERLINE JT R&S	
644.0	\$19,600 \$75,845		0.5537	PW =	0,000	0.5537	PWFn=		
\$41,9	410,043	^	0.0007						- X/79 A
	1	•							YEAR 25
	\$70,500		\$150.00	SQ YD		3.00%		PAVEMENT PATCH CLASS B	
	\$2,465		\$145.00	SQ YD	17	1.00%		SHOULDER PATCH CLASS C	
\$34,8	\$72,965	X	0.4776	PW =		0.4776	PWFn ≃		
								INTERSTATE	YEAR 30
	22.5		<b>6450.00</b>	SQ YD	627	4.00%		PAVEMENT PATCH CLASS B	<del></del>
	\$94,050		\$150.00	SQ YD		1.50%		SHOULDER PATCH CLASS C	
	\$3,770		\$145.00 \$21.85		15,680	100.00%	PVMT )	HMA POLICY OVERLAY 3.75" (	
	\$342,591 \$26,342		\$21.03 \$15.12		1,742	100.00%	SHLD	HMA POLICY OVERLAY 3.75"	
\$192,2	\$466,753	×	0.4120	PW =	1,142	0.4120	PWFn =	***************************************	
\$192,2	Q400,700	^	0.4720						VEAD OF
									YEAR 35
	\$7,840		\$2.00		3,920 Ï	100.00%		LONGITUDINAL SHLD JT R&S	
	\$19,600		\$2.00		9,800 L	100.00%		CENTERLINE JT R&S	
	\$11,760		\$2.00		5,880 L	50.00%	101/ 010	RANDOM CRACK R&S	
	\$7,546		\$2.00		3,773 L	40.00%	IDE 4 FOR	REFLECTIVE TRANSVERSE CRAPD PVMT PATCH M&F HMA SU	
	\$1,273		\$79.54	SQ YD	16 5	0.10%	PWFn =	TO TAMITATON WAP HIVE SE	
\$17,06	\$48,019	Х	0.3554	PW =		0.3554	FVVFII=		
									YEAR 40
	\$11,700		\$150.00	SQ YD	78 5	0.50%		PAVEMENT PATCH CLASS B	
	\$7,840		\$2.00		3,920 L	100.00%		LONGITUDINAL SHLD JT R&S	
	\$19,600		\$2.00		9,800 L	100.00%		CENTERLINE JT R&S	
	\$11,318		\$2.00		5,659 L	60.00%	CK R&S	REFLECTIVE TRANSVERSE CRA	
	\$11,760		\$2.00		5,880 L	50.00%		RANDOM CRACK R&S	
	\$6,204		\$79.54	Q YD	78 5	0.50%		PD PVMT PATCH M&F HMA SU	
\$20,97	\$68,422	X	0.3066	PW =		0.3066	PWFn =	•	
\$311,94									
	m.~		<b>¢0.00</b>	ane Miles	2 22 1		TY	ROUTINE MAINTENANCE ACTIV	
5011.01	\$0 315.0087	CVC	\$0.00 NANCE LIFE-		4.43 L		<del>· · · · · · · · · · · · · · · · · · · </del>		
\$311,94			E ANNUAL CO		MAIN	52	RFn = 0.04070	YEAR LIFE CYCLE CI	45
\$34,27	LEK MILE	ادر	- ANNOAL CC	A I ENWINCE	IVIPALI				

LIFE-CYCL	E COST ANALYSIS:	<b>NEW DESIGN</b>	Calcula	ited / Revised :	9/23/14 8:02 AM				
CONSTRUCTION	INITIAL COST	PRESENT WOR ANNUAL COST PER M		JPCP \$1,505,528 \$165,413	HMA \$1,433,167 \$157,462				
MAINTENANCE	LIFE-CYCLE COST	PRESENT WOR ANNUAL COST PER M		\$311,949 \$34,274	\$501,098 \$55,056				
TOTAL	LIFE-CYCLE COST	PRESENT WOR ANNUAL COST PER M		\$1,817,477 \$199,687	\$1,934,265 \$212,518				
LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY									
LOWEST COST OPTI	ON =======		==>	JPCP	\$199,687				
OTHER OPTIONS (LC	WEST TO HIGHEST);	TYPE / PERCENTA	AGE	НМА	\$212,518	6.4%			

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[Randolph St Ramp IDOT Mechanistic.xlsm]LifeCycleCost

TF flexible (Min) = 3.17 (Min ADT Fig. 54-2.C)	TF rigid (Min) = 4.59 (Min ADT Fig. 54-2.C)
NEW CONSTRUCTION / RECONSTRUCTION PAVI	EMENT DESIGN CALCULATIONS
Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 3.17 PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R) HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)	Use TF rigid = 4.59 Edge Support = Tied Shoulder or C.&G. Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)
Design HMA Mixture Modulus (E _{HMA} ) = 710 ksi (Fig. 54-5.D)  Design HMA Strain (ε _{HMA} ) = 86 (Fig. 54-5.E)  Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)	CRC Pavement
Goto Map Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 4.59 IBR value = 3
Use Full-Depth HMA Thickness = 10.00 inches	CRCP Thickness = 8.00 in. (Fig. 54-4 M)

0.15

112.06

385.44

(Actual ADT)

50%

50%

50%

3.17

Cpv =

Csu =

Cmu =

TF flexible (Actual) =

Number of Lanes

1 Lane Ramp

2 ог 3

6 or more

0.15

132.5

482.53

1.15

TF MUST BE > 60 FOR CRCP

М

100%

50%

45%

37%

Cpv =

Csu =

Cmu =

TF rigid (Actual) =

0.15

143.81

696,42

1.51

0.15

135.78

567.21

(Actual ADT)

50%

50%

4.59

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEME	= EO.O. O. LEGGEATIONS
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 3.17  HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)  Goto Map Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.
Use HMA Overlay Thickness = 7.25 inches	JPCP Thickness = NA inches

Class   Roads   Road	DESIGN TABLES	EDOM DO	= REALITAT	CHARTER	E C BANGER		
A lanes or more   Part of a future 4 lanes or more   One-way Streets with ADT > 3500	DESIGN TABLES	LKOM PDI	WANUAL	CHAPTER	54 - PAVEM	ENT DESIGN	
A lanes or more   Part of a future 4 lanes or more   One-way Street with ADT > 2000   CADT 750 - 2000   CADT 750 - 2000   CADT 750	Class I Roads	1	Class II Roads	3	Class	III Roads	Class IV Post
Part of a future 4 lanes or more One-way Street with ADT <= 3500		2 la	nes with ADT > :	2000			
Class   Class   Csu   Cmu   Csu							
Class   Class   Csu   Cmu   Csu   Cmu   Csu   Cmu   Class		Min Str	lesian Traffic (S	io 54.2.0\	1		
Interstate or Freeway	Facility Type				<del>{</del>		
Other Marked State Route 0 250 750	Interstate or Freeway	0	- +		1		
Unmarked State Route		0	250		]		
*Use marked route minimums for unmarked routes (Fig. 54-1.B)    Traffic Factor ESAL Coefficients   Class Table for Rigid (Fig. 54-4.C)   Flexible (Fig. 54-5.B)   2 or 3 lanes			250				"
Rigid (Fig. 54-4.C)   Flexible (Fig. 54-5.B)   2 or 3 lanes	<ul> <li>Use marked route minimums for unmar</li> </ul>	ked routes (Fig.	54-1.B)			10001	
Rigid (Fig. 54-4.C)   Flexible (Fig. 54-5.B)   2 or 3 lanes		Т	raffic Factor ESA	AL Coefficients		Clas	s Table for
1   143.81   696.42   132.50   482.53   not one-way street)   135.78   567.21   112.06   385.44   ADT   Class   IV   129.58   562.47   109.14   384.35   0 - 749   IV   750 - 2000   III							
1	Class	Csu	Cmu	Csu	Cmu	(not fut	ure 4 lane &
135.78   567.21   112.06   385.44   ADT   Class   129.58   562.47   109.14   384.35   0 - 749   IV   129.58   562.47   109.14   384.35   750 - 2000   III			696.42	132.50	482.53		
IV 129.58 562.47 109.14 384.35 750 - 2000 III	1		567.21	112.06	385.44		
750 - 2000			562.47	109.14	384.35	0 - 749	IV
>2000	IV.	129.58	562.47	109.14	384.35	750 - 2000	o   111   c
						>2000	
		Design La	ne Distribution F	actors For Stru	ıctural Design Trai	fic (Fig. 54-2.B)	
Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)			Rural			rban	7

S

100%

50%

45%

40%

100%

50%

32%

М

100%

50%

45%

40%

100%

50%

32%

8%

100%

50%

45%

37%

# LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	t+	290 Mainline	near Morgan	St			
SECTION COUNTY			2013-012	2R			
LOCATION		Cir	Coc cle interchang				
FACILITY TYPE			INTERSTAT	=			
DDO IFOT I TUDTIL			INIEKSIAI	5			
PROJECT LENGTH # OF CENTERLINES			196	60 FT ==:	> 0.37	Miles	
# OF LANES			5	5 CL 6 LANES			
# OF EDGES			3.3	2 EP			
LANE WIDTH - AVERAGE				2 FT			
SHOULDER WIDTH	HMA Left HMA Right			4 FT			
	HMA Right Total Width of Paved Si	houlders		4 FT 8 FT			
PAVEMENT THICKNESS	(FLEXIBLE)		14.5	0 IN	14.75	5 IN MAX	<
SHOULDER THICKNESS POLICY OVERLAY THICKN	IESS			0 IN			rd Design
· · · · · · · · · · · · · · · · · · ·	100		3.7	5 IN			
FLEX PAVEMENT TRAF	FIC FACTORS		MINIMU	м	ACTUAL		1105
		·	5.8		26.89		USE 26.89
Nelsonmanaeteenolooganieneeleenoloog	VIII NII SANTANA SANTA						Read Me!
HMA COST PER TON HMA SURFACE				est a more a more established a.	UNIT PRICE		Tread Met
HMA TOP BINDER					\$113.60		
HMA LOWER BINDER					\$96.95 \$65.35		
HMA BINDER (LEVELING)					\$96.95		
HMA SHOULDER	TTTEELOOGIA	TTELLELALIS PETTELLISALIS AN			\$72.00		The state of the s
INITIAL COOTS			•				
INITIAL COSTS	THICKNES	S 10	10/ ALLANITUT	/ Liking			
	· · · · · · · · · · · · · · · · · · ·	0 10	3% QUANTITY	UNII	UNIT PRICE		COST
HMA PAVEMENT (FULL-D	EDTU	Land to market and the second	tana araba tata tata tana araba a		in the control of the		
	PEPTH) (14.50"	) 19800	15,680	SQ YD *	\$62.63	/SQ YD	\$982,038 -
HMA SURFACE COURSE	( 2.00"		1,760	TONS	\$113.60	/ TON	\$0
HMA TOP BINDER COURSE HMA LOWER BINDER COU				TONS	\$96.95	/ TON	\$0
Service Commence of the Service of Commence of the Commence of		dans derillinders e	9, (96	TONS	\$65.35	/TON	\$0
HMA SHOULDER	/ 0.00%	· · · · · · · · · · · · · · · · · · ·	Contracting and Contract		**************************************	od American Labor.	1,150° man
CURB & GUTTER	(8.00*	)		TONS	\$72.00		\$56,197 ~
011071		3	:	LIN FT	\$30.00	/LIN FT	\$0
SUBBASE GRAN MATL TY ( IMPROVED SUBGRADE:	• •	_ **		TONS	\$25.00	/TON	\$15,150
		<b>8</b> (1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 1000 € 100	18,166	SQ YD	\$7.00	/SQ YD	\$127,162
Reserved For User Supplied Reserved For User Supplied	d Item		. 0	UNITS	\$0.00	/ UNITS	\$0
	ı item		0	UNITS	\$0.00	/ UNITS	\$0
PAVEMENT REMOVAL SHOULDER REMOVAL			15,680		\$15.00	/ SQ YD	\$235,200
			1,742	SQ YD	\$10.00	/ SQ YĐ	\$17,420
Note: * Denotes User Suppli	ed Quantity	FL	EXIBLE CON:	STRUCTION	I INITIAL COST		\$1,433,167
	F	LEXIBLE CO	NSTRUCTION	ANNUAL C	OST PER MILE		\$157,462
MAINTENANCE COSTS: ITEM	THOMESO						
	THICKNESS	<u> </u>	MATERIAL	<u> </u>	UNIT COST		
ROUTINE MAINTENANCE AC	CTIVITY				\$0.00	LANE-MILE	/ YEAR
HMA OVERLAY PVMT SURF	( 2.00" )	196.0	Surface Mix	15.75%	\$12,75	CO VD	
HMA OVERLAY PVMT	( 3.75" )			3 F.S :	\$21.85		
HMA SURFACE MIX HMA BINDER MIX	(1.50")		Surface Mix	5.54	\$9.56	/ SQ YD	
HMA OVERLAY SHLD	(2.25") (Year 30) (1.75")		Top Binder Mix	2112	\$12.29	SQ YD	
HMA OVERLAY SHLD	(2.00")		Shoulder Mix Shoulder Mix	10-10 2000	\$7.06 / \$8.06 /		
MILLING (2.00 IN)			- N	2.62			
•	011			\$1.550	\$3.00 /	SQ YD	
PARTIAL DEPTH PVMT PAT PARTIAL DEPTH SHLD PAT			Surface Mix	2.33	\$82.72 /		
			Shoulder Mix	250	\$78.06 /	SQ YD	
PARTIAL DEPTH PVMT PATE		Leve	eling Binder Mix	2000	\$80.86 /	SQ YD	
PARTIAL DEPTH SHLD PAT	CH (Mill & Fill +2.00 ")		Shoulder Mix	2.00	\$78.06 /		5
LONGITUDINAL SHOULDER	JOINT ROUT & SEAL				\$2.00 /	LINET	
CENTERLINE JOINT ROUT & RANDOM / THERMAL CRACK	SEAL	e saladari		1 1	\$2.00 /		
THERMAL CRACK	A NOUT & SEAL	(100% Rehab	= 110.00' / Statio	n / Lane)	\$2.00 /		

#### FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

					•	NDARD DES			
PRESEN WORT	COST	ST	UNIT COST	UNIT	QUANTITY	%		ITEM	INTENANCE COSTS:
									YEAR 5
	\$7,840	0	\$2.00	LIN FT	3.920	100.00%		LONG SHLD JT R&S	
	\$19,600		\$2.00	LIN FT		100.00%		CNTR LINE JOINT R&S	
	\$12,936		\$2.00	LIN FT		50.00%		RNDM / THRM CRACK R&S	
	\$1,324		\$82.72	SQ YD		0.10%		PD PVMT PATCH M&F SURF	
\$35,97	\$41,700		0.8626	PW =		0.8626	PWFn =		
									YEAR 10
	\$7,840	0	\$2.00	LIN FT	3,920	100.00%		LONG SHLD JT R&S	
	\$19,600		\$2.00	LIN FT	9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936		\$2.00	LIN FT		50.00%		RNDM / THRM CRACK R&S	
	\$6,452	2	\$82.72	SQ YD	78	0.50%		PD PVMT PATCH M&F SURF	
\$34,844	\$46,828	41 X	0.7441	PW =		0.7441	PWFn =		
							***************************************		YEAR 15
	\$52,266	0	\$3.00	SQ YD	17,422	100.00%		MILL PVMT & SHLD 2,00"	
	\$12,695	6	\$80.86	SQ YD	157	1.00%	2.00"	PD PVMT PATCH M&F ADD'L	
	\$199,962	5	\$12.75	SQ YD	15,680	100.00%		HMA OVERLAY PVMT 2.00"	
	\$14,049	6	\$8.06	SQ YD	1,742	100.00%		HMA OVERLAY SHLD 2.00 "	
\$179,062	\$278,972	19 X	0.6419	PW =		0.6419	PWFn =	•	
							*****		YEAR 20
	\$7,840	0	\$2.00	LINFT	3,920	100.00%		LONG SHLD JT R&S	
	\$19,600		\$2.00	LIN FT	9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936		\$2.00	LIN FT		50.00%		RNDM / THRM CRACK R&S	
	\$1,324	2	\$82.72	SQ YD	16	0.10%		PD PVMT PATCH M&F SURF	
\$23,088	\$41,700	37 X	0.5537	PW =		0.5537	PWFn =		
							TTWILL.		YEAR 25
	\$7,840	0	\$2.00	LIN FT	3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	0	\$2.00	LIN FT	9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	0	\$2.00	LIN FT	6,468	50.00%		RNDM / THRM CRACK R&S	
	\$6,452	~~~~~	\$82.72	SQ YD	78	0.50%		PD PVMT PATCH M&F SURF	
\$22,365	\$46,828	6 X	0.4776	PW =		0.4776	PWFn =	HMA_SD	
								INTERSTATE	YEAR 30
	\$47,040	0	\$3.00	SQ YD	15,680	100.00%		MILL PVMT ONLY 2.00"	
	\$25,390	6	\$80.86	SQ YD	314	2.00%	2.00"	PD PVMT PATCH M&F ADD'L	
	\$1,327		\$78.06	SQ YD	17	1.00%	2.00"	PD SHLD PATCH M&F SURF	
	\$342,591	5	\$21.85	SQ YD	15,680	100.00%		HMA OVERLAY PVMT 3.75"	
	\$12,293		\$7.06	SQ YD	1,742	100.00%		HMA OVERLAY SHLD 1.75 "	
\$176,594	\$428,641	0 X	0.4120	PW =		0.4120	PWFn =		
							****		YEAR 35
	\$7,840		\$2.00	LIN FT		100.00%		LONG SHLD JT R&S	
	\$19,600		\$2.00	LIN FT		100.00%		CNTR LINE JOINT R&S	
	\$12,936		\$2.00	LIN FT		50.00%		RNDM / THRM CRACK R&S	
	\$1,324		\$82.72	SQ YD	16	0.10%		PD PVMT PATCH M&F SURF	
\$14,819	\$41,700	i4 X	0.3554	PW =		0.3554	PWFn =		
									YEAR 40
	\$7,840		\$2.00	LIN FT	•	100.00%	<u> </u>	LONG SHLD JT R&S	
	\$19,600		\$2.00	LIN FT		100.00%		CNTR LINE JOINT R&S	
	\$12,936		\$2.00	LIN FT		50.00%		RNDM / THRM CRACK R&S	
φ11 <b>Λ</b>	\$6,452		\$82.72	SQ YD	78	0.50%	DIME: -	PD PVMT PATCH M&F SURF	
\$14,355	\$46,828	Χ σ	0.3066	PW =		0.3066	PWFn≔		
\$501,098	: -								
\$0	\$0	1	0.00	Lane Miles	2 22		IVITY	ROUTINE MAINTENANCE ACT	
			NANCE LIF						
\$501,098				1212 411 X F W				YEAR LIFE CYCLE	

ROUTE SECTION COUNTY LOCATION FACILITY TYPE	I-290 I	Circle	ear Morgan S 2013-012F Cool Interchange	₹ k <del>2</del>			
PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH PCC PCC Total Width	Left Right of Paved Should	ders	5 6 2 12 4 4	FT == 5 CL 6 LANES 2 EP 2 FT 1 FT 5 FT	> 0.37	' Miles	
PAVEMENT THICKNESS (RIGID) SHOULDER THICKNESS		JPCP	11.00 11.00		TIED SHLD		
POLICY OVERLAY THICKNESS			3.75	IN			
RIGID PAVEMENT TRAFFIC FACTOR	S		MINIMUM		ACTUAL	-	USE
Worksheet Construction Type is Ro	econstruction		8.26		37.44 avement Type is	-	37.44 JPCP
INITIAL COSTS	THICKNESS	100	% QUANTITY		UNIT PRICE		COST
JPC PAVEMENT	(11.00")						
PAVEMENT REINFORCEMENT STABILIZED SUBBASE	( 11.00") ( 4.00")		15,680 0 16,333	SQ YD	\$22.00	/ SQ YD / SQ YD / SQ YD	\$743,546 \$0 \$310,327
PCC SHOULDERS CURB & GUTTER				SQ YD LIN FT	\$40.00 \$30.00	/SQYD /LIN FT	\$69,680 \$0
SUBBASE GRAN MATL TY C IMPROVED SUBGRADE:	(~ 1.72°) Aggregate 'A	km = \$10	235 17,640	TONS SQ YD	\$25.00 \$7.00	/TON /SQ YD	\$5,875 \$123,480
Reserved For User Supplied Item Reserved For User Supplied Item				UNITS UNITS		/ UNITS / UNITS	\$0 \$0
PAVEMENT REMOVAL SHOULDER REMOVAL			15,680 1,742		\$15.00 \$10.00		\$235,200 \$17,420
Note: * Denotes User Supplied Quantity		RIGID CON	RIGID CONS	STRUCTIO ANNUAL (	N INITIAL COST COST PER MILE	WALL ST	\$1,505,528 \$165,413
MAINTENANCE COSTS: ITEM	THICKNESS		MATERIAL	12	UNIT COST		
ROUTINE MAINTENANCE ACTIVITY					\$0.00	/ LANE-MILE	YEAR
HMA POLICY OVERLAY HMA POLICY OVERLAY PVMT	(3.75")	1.554.0		3.75	604.05		
HMA SURFACE MIX	(1.50")	.043 1 P	Surface Mix	9 73 1.89	\$21.85 \$9.56	/SQ YD	
HMA BINDER MIX HMA POLICY OVERLAY SHLD	(2.25")	0.001	Top Binder Mix	1.35	\$12.29	/SQ YD	
	(3.75*)		Shoulder Mix	35, 75	\$15.12	/ SQ YD	
CLASS A PAVEMENT PATCHING CLASS B PAVEMENT PATCHING					\$195.00		
CLASS C SHOULDER PATCHING					\$150.00 \$145.00		
PARTIAL DEPTH PVMT PATCH (Mill & F PARTIAL DEPTH PVMT PATCH (Mill & F	ill HMA Surf) ill HMA 1.50")		Surface Mix Surface Mix	1,80 1,80	\$79.54 \$79.54	/ SQ YD	
LONGITUDINAL SHOULDER JOINT ROUT CENTERLINE JOINT ROUT & SEAL					\$2.00 \$2.00	/LIN FT	
REFLECTIVE TRANSVERSE CRACK ROL			•		\$2.00		
RANDOM CRACK ROUT & SEAL	(100% Reha	b = 100.00°/	Station / Lane)		\$2.00	/LIN FT	

#### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

NCE COSTS: ITEM		%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 10								
PAVEMENT PATCH CLASS B		0.10%	16	SQ YD	\$150.00		67.400	
	PWFn =	0.7441		PW =	0.7441	Y	\$2,400 \$2,400	61 700
		• • • • • • • • • • • • • • • • • • • •		. ,, -	0.7441	^	φ <b>2,400</b>	\$1,786
YEAR 15			···	*****				
PAVEMENT PATCH CLASS B		0.20%	31	SQ YD	\$150.00		\$4,650	
	PWFn =	0.6419		PW =	0.6419	Х	\$4,650	\$2,985
YEAR 20					_		• ••	42,000
PAVEMENT PATCH CLASS B		2.00%		SQ YD	\$150.00		\$47,100	
SHOULDER PATCH CLASS C LONGITUDINAL SHLD JT R&S		0.50%		\$Q YD	\$145.00		\$1,305	
CENTERLINE JT R&S		100.00%	-	LIN FT	\$2.00		\$7,840	
OLIVIEREINE 31 RAS	DIACE	100.00%	9,800	LIN FT	\$2.00		\$19,600	
	PWFn ≂	0.5537		PW ≃	0.5537	Х	\$75,845	\$41,994
YEAR 25			***					
PAVEMENT PATCH CLASS B		3.00%	470	SQ YD	6450.00			
SHOULDER PATCH CLASS C		1.00%		SQ YD	\$150.00		\$70,500	
	PWFn =	0.4776	1.7	PW =	\$145.00 0.4776	<del></del>	\$2,465	801010
		0.11.10		1 44 -	0.4770	^	\$72,965	\$34,848
YEAR 30 INTERSTATE	****		7.00		10-1			
PAVEMENT PATCH CLASS B		4.00%	627	SQ YD	\$150.00		\$94,050	
SHOULDER PATCH CLASS C		1.50%		SQ YD	\$145.00		\$3,770	
HMA POLICY OVERLAY 3.75" (P	VMT)	100.00%	15,680		\$21.85		\$342,591	
HMA POLICY OVERLAY 3.75" (S	HLD)	100.00%	1,742	SQ YD	\$15.12		\$26,342	
	PWFn =	0.4120		PW =	0.4120	Х	\$466,753	\$192,296
YEAR 35 INTERSTATE								* ,
				···				
LONGITUDINAL SHLD JT R&S CENTERLINE JT R&S		100.00%		LIN FT	\$2.00		\$7,840	
RANDOM CRACK R&S		100.00%		LIN FT	\$2.00		\$19,600	
REFLECTIVE TRANSVERSE CRAC	W D00	50.00%	5,880		\$2.00		\$11,760	
PD PVMT PATCH M&F HMA SUR	W K@2	40.00%	3,773		\$2.00		\$7,546	
ESTANTIATION MAI TIMA SON	PWFn =	0.10%	16	SQ YD	\$79.54		\$1,273	
	LAALII	0.3554		PW =	0.3554	Х	\$48,019	\$17,065
YEAR 40 INTERSTATE								
PAVEMENT PATCH CLASS B		0.50%	70	SQ YD	6450.00		044700	
LONGITUDINAL SHLD JT R&S		100.00%	3,920		\$150.00 \$2.00		\$11,700	
CENTERLINE JT R&S		100.00%	9,800		\$2.00 \$2.00		\$7,840	
REFLECTIVE TRANSVERSE CRAC	K R&S	60.00%	5,659		\$2.00 \$2.00		\$19,600	
RANDOM CRACK R&S		50.00%	5,880		\$2.00 \$2.00		\$11,318 \$11,760	
PD PVMT PATCH M&F HMA SURI	F 1.50"	0.50%	78	SQ YD	\$79.54		\$6,204	
	PWFn=	0.3066		PW≃	0.3066	X	\$68,422	\$20,975
					0.0000	^	400,455	\$311,949
ROUTINE MAINTENANCE ACTIVITY	Y		2.23	Lane Miles	\$0.00		\$0	\$0
[45] VE 48 LUII					ENANCE LIFE	-CY		\$311,949
45 YEAR LIFE CYCLE CRF	n = 0.04078	152	MAI		E ANNUAL C			\$34,274

LIFE-CYCL	E COST ANA	LYSIS: NEW DESIGN	Calculated / Revised	: 9/23/14 8:02 AM	
CONSTRUCTION	INITIAL COST	PRESENT WO ANNUAL COST PER	4.,000,000	8 \$1,433,167	
MAINTENANCE	LIFE-CYCLE COST		RTH \$311,94	9 \$501,098	
TOTAL	LIFE-CYCLE COST	PRESENT WO ANNUAL COST PER I			
LIFE-CYCL	E COST ANA	LYSIS: FINAL SUMMAR	Y		
LOWEST COST OPT	ION		==> JPCI	\$199,687	_
OTHER OPTIONS (LC	OWEST TO HIGHEST):	TYPE / PERCENT	AGE HMA	\$212,518	1

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[Washington Blvd Ramp IDOT Mechanistic.xlsm]LifeCycleCost

#### **IDOT MECHANISTIC PAVEMENT DESIGN**

Printed: 08/26/2019 PROJECT AND TRAFFIC INPUTS (Enter Data in Gray Shaded Cells)

Route: Madison Street Ramps at I-90/94 Comments: Circle Interchange Project Contract 62A76 & 62A77

Section: 2015-019R ONP County: Cook Design Date: 08/02/2019 <-- BY

Location: Circle Interchange Modify Date: <-- BY ADT Year 2012 5,200 Current: Facility Type Interstate or Freeway ** Ramp Design Fig. 54-1.B ** Future: 6,000 2040

# of Lanes = 1 Lane Ramp Crossroad? Unmarked State Route

> # of Lanes = 4 Structural Design Traffic Minimum Actual %of

% of ADT in Road Class: 1 ADT ADT Total ADT Design Lane PV = 0 5,371 94.0% 100% Subgrade Support Rating (SSR): Poor \$U = 250 114 2.0% \$ = 100% Construction Year: 100% MU = M = 2020 750 229 4.0% Design Period (DP) = Struct, Design ADT = 5,714 (2030) 20 years

TRAFFIC FACTOR CALCULATION

		IRAFFIC F.	ALIUR LA	CULATION			
FLEXIBLE P	AVEMENT	RAMP DESI	ON MIN	RIGID P.	AVEMENT	RAMP DES	SIGN MIN
Cpv =	0.15	0.15	50%	Cpv =	0.15	0.15	50%
Csu =	132.5	112.06	50%	Csu =	143.81	135.78	50%
Cmu =	482,53	385.44	50%	Cmu =	696.42	567.21	50%
TF flexible (Actual) =	2.52	(Actual ADT)	3.17	TF rigid (Actual) =	3.53	(Actual ADT)	4.59
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2	2.C)	TF rigid (Min) =	4.59	(Min ADT Fig.	54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS							
Full-Depth HMA Pavement	JPC Pavement						
Use TF flexible = 3.17 PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 4.59 Edge Support = Tied Shoulder or C.&G.						
Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)  Design HMA Mixture Modulus (E _{HMA} ) = 710 ksi (Fig. 54-5.D)	Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)						
Design HMA Strain ( $\varepsilon_{HMA}$ ) = 86 (Fig. 54-5.E)	CRC Pavement						
Goto Map Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F) Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 4.59 IBR value = 3						
Use Full-Depth HMA Thickness = 10.00 inches	CRCP Thickness = 8.00 in. (Fig. 54-4.M)						

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS						
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay					
Use TF flexible = 3.17  HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)  Goto Map Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.					
Use HMA Overlay Thickness = 7.25 inches	JPCP Thickness = NA inches					

CONTACT BMPR FOR ASSISTANCE

#### DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more One-way Streets with ADT > 3500	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)

	Min. Str.	Min. Str. Design Traffic (Fig 54-2.C)				
Facility Type	PV	SU*	MU*			
Interstate or Freeway	0	500	1500			
Other Marked State Route	0	250	750			
Unmarked State Route	0	250	750			

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients					
	Rigid (	Fig. 54-4.C)	Flexible (Fig. 54-5.B)			
Class	Csu	Cmu	Csu	Cmu		
	143.81	696.42	132.50	482.53		
II.	135.78	567.21	112.06	385.44		
III	129.58	562.47	109.14	384.35		
IV	129.58	562.47	109.14	384.35		

Class Table for				
One-Way Streets				
ADT	Class			
0 - 3500	II			
>3501	1			

Class Table for					
2 or 3 lanes					
(not future 4 lane &					
not one-way street)					
ADT Class					
0 - 749	IV				
750 - 2000	Ш				
>2000	11				

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
 	Rural			Urban		
Number of Lanes	Р	S	M	P	S	М
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

## LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## **FULL-DEPTH HMA PAVEMENT**

Standard Design

ROUTE	1-290	Mainline ne	ar Morgan St				
SECTION COUNTY			2013-012R Cook				
LOCATION		Circle	Interchange				
FACILITY TYPE		ı	NTERSTATE				
PROJECT LENGTH				FT ==>	0.3	7 Miles	
# OF CENTERLINES # OF LANES				CL LANES			
# OF EDGES			2	EP			
LANE WIDTH - AVERAGE SHOULDER WIDTH HMA Left				FT			
HMA Right	المحادث الم	lala		FT			
Total Width of Pave	o Snoul	iders	8	FT			
PAVEMENT THICKNESS (FLEXIBLE)			14.50	IN	14.7	5 IN MAX	•
SHOULDER THICKNESS			8.00	IN		Standa	-
POLICY OVERLAY THICKNESS			3.75	IN			
FLEX PAVEMENT TRAFFIC FACTORS			MINIMUM		ACTU/	.I	USE
			5.85		26.8		26.89
							Read Mel
HMA COST PER TON	. o e e e e e e e e e e e e e e e e e e	Philosophic Control College Control	Austria Harristonia (h. 1921)	era	UNIT PRIC		
HMA SURFACE HMA TOP BINDER						) /TON 5 /TON	
HMA LOWER BINDER					\$65.3	7 / TON	
HMA BINDER (LEVELING) HMA SHOULDER						5 /TON ) /TON	
Contributing Contributing Contribution of the symbol property of the Contribution Contribution of the Cont	or activity to the series;	-parameter and State States					
INITIAL COSTS							
ITEM THICK	NESS	1009	6 QUANTITY	UNIT	UNIT PRIC	<u>E</u>	COST
						okude (bresiti i si	
HMA PAVEMENT (FULL-DEPTH) (14	4.50")	1898193	15,680	SQ YD *	562.6	3 / SQ YD	\$982,038 ~
	2.00" } 2.25" }	69.63 399.63	1,760 1,990			)/TON S/TON	\$0 \$0
•	0.25")		9,196			7 TON	\$0 \$0
- 2017 1 2-10 1 2-10 1 2-10 2-10 2-10 2-10 2-1	3.00*)			TONS	*************	) /TON	\$56,197 <i>~</i>
CURB & GUTTER			. 0	LIN FT	. \$30.0	) /LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS) IMPROVED SUBGRADE: Agg	roacio :	servers and servers		TONS	1, 1	) / TON	\$15,150
INFROVED SUBGRADE. Aggi	eyate	Atom v Sad	18,166	5Q 1D		) /SQYD	\$127,162
Reserved For User Supplied Item Reserved For User Supplied Item				UNITS UNITS		) /UNITS ) /UNITS	\$0 \$0
•							
PAVEMENT REMOVAL SHOULDER REMOVAL			15,680 1,742			) /SQYD ) /SQYD	\$235,200 \$17,420
Note: * Denotes User Supplied Quantity		FI:	EXIBLE CON	STRUCTIO	N INITIAL COS	т —	\$1,433,167
	FL				COST PER MIL	_	\$157,462
MAINTENANCE COSTS:							
ITEM THICK	NESS		MATERIAL		UNIT COS	<u>T</u>	
ROUTINE MAINTENANCE ACTIVITY			1		\$0.0	LANE-MII	LE / YEAR
HMA OVERLAY PVMT SURF (	2.00")	140.2	Surface Mix	2.40	\$12.7	5 /SQYD	
	3.75")	1,8743		S. 222	\$21.B	5 / SQ YD	
	1.50") 2.25"}	1.0649	Surface Mix Top Binder Mix			3 / SQ YD - 3 / SQ YD	
HMA OVERLAY SHLD (Year 30) (	1.75" }		Shoulder Mix	1.30	\$7.0	S /SQYD	,
·	2.00* )		Shoulder Mix			3 /SQYD	
MILLING (2.00 IN)				2:00	\$3.0	) /SQYD	
PARTIAL DEPTH PVMT PATCH (Mill & FI		•	Surface Mix			2 /5Q YD	
PARTIAL DEPTH SHLD PATCH (Mill & Fi	ıı Suri)		Shoulder Mix	2.00	\$78.0	S /SQYD	
PARTIAL DEPTH PVMT PATCH (Mill & Fill + PARTIAL DEPTH SHLD PATCH (Mill & Fill +		Lev	eling Binder Mix			3 /SQ YD	
	-		Shoulder Mix	Assert 		S /SQYD	
LONGITUDINAL SHOULDER JOINT ROUT & SE CENTERLINE JOINT ROUT & SEAL	EAL					/LINFT	
RANDOM / THERMAL CRACK ROUT & SEAL		(100% Rehab	= 110.00' / Stati	on / Lane)		) /LINFT	:

#### FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

		STA	INDARD DES	IGN				
MAINTENANCE COSTS:	ITEM		%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
				Q071111111		***************************************		
YEAR 5	L CALC CALL TO BE			-1 1-1		20.00		
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.10%	16	SQ YD	\$82.72	\$1,324	******
		PWFn =	0.8626		PW =	0.8626	K \$41,700	\$35,971
YEAR 10								
<u></u>	LONG SHLD JT R&S		100.00%	3.920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.50%		SQ YD	\$82.72	\$6,452	
		PWFn =	0.7441		PW =			\$34,844
	47-1444			·····				
YEAR 15	MILL PVMT & SHLD 2.00"		100.00%	17 422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L	2.00"	1.00%		SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"	2.50	100.00%		SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "		100.00%		SQ YD	\$8.06	\$14,049	
	THE PARTY OFFICE AND	PWFn =	0.6419	1,142	PW ≂			\$179,062
		. *** **	5.0713			3.0410 /		¥.,0,002
YEAR 20								
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	DIACE .	0.10%	16	SQ YD	\$82.72	\$1,324	<b>too</b> 000
		PWFn =	0.5537		PW =	0.5537 >	< \$41,700	\$23,088
YEAR 25						-		
<del></del>	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.50%	78	SQ YD	\$82.72	\$6,452	
	1844 00	PWFn =	0.4776		PW =	0.4776	< \$46,828	\$22,365
YEAR 30	HMA_SD INTERSTATE							
1 1 EAR 00	MILL PVMT ONLY 2.00"		100.00%	15 680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L	2 00"	2.00%		SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF		1.00%		SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75"	2.00	100.00%		SQ YD	\$21.85	\$342,591	
	HMA OVERLAY SHLD 1.75"		100.00%		SQ YD	\$7.06	\$12,293	
	The state of the s	PWFn =	0.4120	1,472	- PW =			\$176,594
								4
YEAR 35					4 45 4 644			
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	PWFn.≃	0.10% 0.3554	16	SQ YD =	\$82.72 0.3554 >	\$1,324 J < \$41,700	\$14,819
	•	r vv rn.≃	0.3004		r~vv ==	0.3004 /	\$ \$41,700	φ14,019
YEAR 40								
<del></del>	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.50%	78	SQ YD	\$82.72	\$6,452	
		PWFn =	0.3066		PW =	0.3066 >	< \$46,828	\$14,355
								\$501,098
								400 1 ₁ 030
	ROUTINE MAINTENANCE ACT	IVITY		2.23	Lane Mile		\$0	\$0_
·	] vere (155 ever					TENANCE LIFE-		\$501,098
45	YEAR LIFE CYCLE	CRFn = 0.0407	7852	M	AINTÉNAN	ICE ANNUAL CO	ST PER MILE	\$55,056

PCC PAVEMENT JPCP

ROUTE 1-290 Mainline near Morgan St SECTION 2013-012R COUNTY Cook LOCATION Circle Interchange **FACILITY TYPE** INTERSTATE PROJECT LENGTH 1960 FT ==> 0.37 Miles # OF CENTERLINES 5 CL # OF LANES 6 LANES # OF EDGES 2 EP LANE WIDTH - AVERAGE 12 FT SHOULDER WIDTH PCC Left 4 FT PCC Right 4 FT Total Width of Paved Shoulders 8 FT PAVEMENT THICKNESS (RIGID) **JPCP** 11.00 IN TIED SHLD SHOULDER THICKNESS 11.00 IN POLICY OVERLAY THICKNESS 3.75 IN RIGID PAVEMENT TRAFFIC FACTORS MINIMUM **ACTUAL** USE 8.26 37.44 37.44 Worksheet Construction Type is Reconstruction The Pavement Type is **JPCP INITIAL COSTS** ITEM **THICKNESS** 100% QUANTITY UNIT UNIT PRICE COST JPC PAVEMENT (11.00") 15,680 SQ YD \$47.42 /SQ YD \$743,546 PAVEMENT REINFORCEMENT \$22.00 / SQ YD 0 SQ YD STABILIZED SUBBASE (4.00")16,333 SQ YD \$19.00 / SQ YD \$310,327 PCC SHOULDERS \$40.00 / SQ YD 1.742 SQ YD \$69,680 **CURB & GUTTER** 0 LIN FT \$30.00 / LIN FT \$0 SUBBASE GRAN MATL TY C (~1.72°) 235 TONS \$25.00 /TON \$5,875 IMPROVED SUBGRADE: Aggregate 17,640 SQYD \$7.00 / SQ YD \$123,480 Reserved For User Supplied Item 0 LINITS \$0.00 / UNITS \$0 Reserved For User Supplied Item 0 UNITS \$0.00 /UNITS \$0 PAVEMENT REMOVAL \$235,200 15,680 SQ YD \$15.00 / SQ YD SHOULDER REMOVAL \$10.00 /SQYD 1,742 SQ YD \$17,420 Note: * Denotes User Supplied Quantity RIGID CONSTRUCTION INITIAL COST \$1,505,528 RIGID CONSTRUCTION ANNUAL COST PER MILE \$165,413 **MAINTENANCE COSTS: THICKNESS** MATERIAL ITEM **UNIT COST ROUTINE MAINTENANCE ACTIVITY** \$0.00 /LANE-MILE/YEAR HMA POLICY OVERLAY 3.75" HMA POLICY OVERLAY PVMT (3.75" \$21.85 / SQ YD HMA SURFACE MIX (1.50") \$9.56 / SQ YD Surface Mix HMA BINDER MIX 2.25" \$12.29 / SQ YD Top Binder Mix HMA POLICY OVERLAY SHLD (3.75") Shoulder Mix \$15.12 /SQYD CLASS A PAVEMENT PATCHING \$195.00 / SQ YD CLASS B PAVEMENT PATCHING \$150.00 / SQ YD CLASS C SHOULDER PATCHING \$145.00 / SQ YD PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf) Surface Mix \$79.54 / SQ YD PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50") Surface Mix \$79.54 / SQ YD

(100% Rehab = 100.00' / Station / Lane)

LONGITUDINAL SHOULDER JOINT ROUT & SEAL

REFLECTIVE TRANSVERSE CRACK ROUT & SEAL

CENTERLINE JOINT ROUT & SEAL

RANDOM CRACK ROUT & SEAL

\$2.00 / LIN FT

\$2.00 / LIN FT

\$2.00 / LIN FT

\$2.00 / LIN FT

### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

MAINTENANCE COSTS:	ITEM		%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
								_
YEAR 10			0.10%	10	SQ YD	\$150,00	\$2,400	
	PAVEMENT PATCH CLASS B	PWFn =	0.7441	10	PW =			\$1,786
		. *** –	0.7771		, ,, –	0.1441 7.	Ψ2,400	ψ1,100
YEAR 15								
	PAVEMENT PATCH CLASS B		0.20%	31	SQ YD	\$150.00	\$4,650	
		PWFn =	0.6419		PW =	0.6419 X	\$4,650	\$2,985
YEAR 20	1					•		
12/11/20	PAVEMENT PATCH CLASS B		2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C		0.50%	9	SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	DIACE.	100.00%	9,800	LINFT	\$2.00	\$19,600	644.004
		PWFn≕	0.5537		PW =	0.5537 X	\$75,845	\$41,994
YEAR 25				· · · · · · · · · · · · · · · · · · ·				
	PAVEMENT PATCH CLASS B		3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C		1.00%	17	SQ YD	\$145.00	\$2,465	_
		PWFn =	0.4776		. PW =	0.4776 X	\$72,965	\$34,848
YEAR 30	INTERSTATE							
	PAVEMENT PATCH CLASS B		4.00%	627	SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C		1.50%		SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (		100.00%		SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (		100.00%	1,742	SQ YD	\$15.12	\$26,342	6400 000
		PWFn =	0.4120		PW =	0.4120 X	\$466,753	\$192,296
YEAR 35	INTERSTATE							
	LONGITUDINAL SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S		50.00%		LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SU		40.00% 0.10%		LIN FT SQ YD	\$2.00 \$79.54	\$7,546 \$1,273	
	PD FVIVII FAICH WAF HWA SC	PWFn =	0.3554	10	PW =			\$17,065
			0.000			0.0001 7	<b>4</b> 10,0 10	<b>4</b> 17,000
YEAR 40								
	PAVEMENT PATCH CLASS B		0.50%		SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S CENTERLINE JT R&S		100.00% 100.00%		LINFT	\$2.00 \$2.00	\$7,840   \$19,600	
	REFLECTIVE TRANSVERSE CRA	ACK BAS	60.00%		LIN FT LIN FT	\$2.00 \$2.00	\$11,318	
	RANDOM CRACK R&S	10111140	50.00%		LINFT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SU	JRF 1.50"	0.50%		SQ YD	\$79.54	\$6,204	
		PWFn =	0.3066		PW =	0.3066 X	\$68,422	\$20,975
							•	\$311,949
	ROUTINE MAINTENANCE ACTIV	TY		2 23	Lane Mile	\$ \$0.00	\$0	\$0
	TOO THE WAITTENANCE NOTIV			2.20		TENANCE LIFE-C		\$311,949
45	YEAR LIFE CYCLE C	RFn = 0.0407	7852	M	AINTENAN	ICE ANNUAL COS	ST PER MILE	\$34,274
								•
	•			*				
	1						*.	
	•							

LIFE-CYCL	E COST ANALYSIS:	NEW DESIGN o	alculated / Revised:	9/23/14 8:02 AM
			JPCP	НМА
CONSTRUCTION	INITIAL COST	PRESENT WORTH	H \$1,505,528	\$1,433,167
		ANNUAL COST PER MILE	E \$165,413	\$157,462
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	H \$311,949	\$501,098
		ANNUAL COST PER MILI	E \$34,274	\$55,056
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	-l \$1,817,477	\$1,934,265
		ANNUAL COST PER MILI	E \$199,687	\$212,518
LIFE-CYCL	E COST ANALYSIS:	FINAL SUMMARY	······································	
LOWEST COST OPT	ION ======	<b></b>	> JPCP	\$199,687
OTHER OPTIONS (L	OWEST TO HIGHEST):	TYPE / PERCENTAGE	E HMA	\$212.518

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[Madison St Ramp IDOT Mechanistic.xlsm]LifeCycleCost

Printed: 08/26/2019

E 5401 Template (Rev. 09/05/2013)	IMECHA	NISTIC PAVE	MENIDE	SIGN			Printed: (	08/26/2019
	PROJECT	AND TRAFF	IC INPUT	S	(Enter Data	in Gray Shad	ed Cells)	
Route: Adams St. Ramps at I-90/94	Comments:	Circle Interchange	Project Cont	ract 62A76 &	62A77			
Section: 2015-019R								
County: Cook	Design Date:	08/02/2019	ONP	< BY			•	
Location: Circle Interchange	Modify Date:			<- BY	ADT	Үеаг	]	
Statement of the statem				Current:	4,400	2012		
Facility Type Interstate or Freeway	JE 2004 OF GOOD A From which will be a second	** Ramp Design F	A THE RESERVE THE PROPERTY OF THE PARTY OF T	Future:	5,000	2040		
# of Lanes =	1 Lane Ramp	*	Unmarked S	tate Route				
		# of Lanes =	4		Structural D	esign Traffic		
				Minimum	Actual	Actual %of	% of A	
Road Class:	1			ADT	ADT	Total ADT	Design	Lane
	year that the capture to be a second		PV =	0	4,499	94.0%	P≐	100%
Subgrade Support Rating (SSR):	Poor		SU =	250	191	4.0%	S =	100%
Construction Year:	2020		MU =	750	96	2.0%	M =	100%
Design Period (DP) =	20	years	Struct. D	esign ADT =	4,786	(2030)		
		TRAFFIC F	ACTOR CA	LCULATION	<u>l</u>			
FLEXIBLE	<b>PAVEMENT</b>	RAMP DESIG	3N MIN		RIGID F	PAVEMENT	RAMP DES	IGN MIN
Cpv =	0.15	0.15	50%		Cpv ≖	0.15	0.15	50%
Csu =	132.5	112.06	50%		Csu =	143.81	135.78	50%
Cmu =	482.53	385.44	50%		Cmu =	696.42	567.21	50%
TF flexible (Actual) =	1.44	(Actual ADT)	3.17	TF rig	id (Actual) =	1.90	(Actual ADT)	4.59
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2	2.C)	TF	rigid (Min) =	4.59	(Min ADT Fig.	54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS						
Full-Depth HMA Pavement	JPC Pavement					
Use TF flexible = 3.17	Use TF rigid = 4.59					
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Edge Support = Tied Shoulder or C.&G.					
Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)	Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)					
Design HMA Mixture Modulus (E _{HMA} ) = 710 ksi (Fig. 54-5.D)						
Design HMA Strain ( $\varepsilon_{\text{HMA}}$ ) = 86 (Fig. 54-5.E)	CRC Pavement					
Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)	Use TF rigid = 4.59					
Goto Map Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.1)	IBR value = 3					
Use Fuli-Depth HMA Thickness ≠ 10.00 inches	CRCP Thickness = 8.00 in. (Fig. 54-4.M)					

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS							
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay						
Use TF flexible = 3.17  HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)  Goto Map  Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.						
Use HMA Overlay Thickness = 7.25 inches	JPCP Thickness = NA inches						

CONTACT BMPR FOR ASSISTANCE

# DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more One-way Streets with ADT > 3500	Опе way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)

	Min. Str. Design Traffic (Fig 54-2.C)			
Facility Type	PV	SU*	MU*	
Interstate or Freeway	0	500	1500	
Other Marked State Route	0	250	750	
Unmarked State Route	0	250	750	

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients				
	Rigid (	Fig. 54-4.C)	Flexible (Fig. 54-5.B)		
Class	Csu	Cmu	Csu	Cmu	
	143.81	696.42	132.50	482.53	
li li	135.78	567.21	112.06	385.44	
III	129.58	562.47	109.14	384.35	
1V	129.58	562,47	109.14	384.35	

Class Table for					
One-Way Streets					
ADT Class					
0 - 3500	11				
>3501	I				

Class Table for						
2 or 3 lanes						
(not future 4 lane &						
not one-v	way street)					
ADT Class						
0 - 749	IV					
750 - 2000						
>2000	11					

	Design La	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
		Urban					
Number of Lanes	Р	S	М	Р	S	М	
1 Lале Ramp	100%	100%	100%	100%	100%	100%	
2 or 3	50%	50%	50%	50%	50%	50%	
4	32%	45%	45%	32%	45%	45%	
6 or more	20%	40%	40%	8%	37%	37%	

# LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## **FULL-DEPTH HMA PAVEMENT**

Standard Design

				•		
SECTION COUNTY	-290 Mainline ne	2013-012R Cook				e e e e e e e e e e e e e e e e e e e
LOCATION		Interchange				
FACILITY TYPE	ı	NTERSTATE				
PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH HMA Left HMA Right Total Width of Paved	Shoulders	5 6 2 12 4 4	FT ==> CL LANES EP FT FT FT	0.37	Miles	
PAVEMENT THICKNESS (FLEXIBLE) SHOULDER THICKNESS POLICY OVERLAY THICKNESS		14.50 8.00 3.75	IN		IN MAX Standare	d Design
FLEX PAVEMENT TRAFFIC FACTORS		MINIMUM 5.85		ACTUAL 26.89		USE 26.89
						Read Me!
HMA COST PER TON HMA SURFACE				UNIT PRICE \$113.60		
HMA TOP BINDER HMA LOWER BINDER HMA BINDER (LEVELING) HMA SHOULDER	Christophes (d. magazi) - Separatal Security Security (d. magazi) - Separatal Security (d. magazi) - Security (d. magazi) - Security (d. magazi) - Security (d. magaz			\$96.95 \$65.35 \$96.95 \$72.00	/TON /TON /TON	čujeto, spi "Leijo pielesu ("Leijo
INITIAL COSTS ITEM THICKNE	SS 100°	% QUANTITY	UNIT	UNIT PRICE		COST
HMA PAVEMENT (FULL-DEPTH) (14.5	O*) 18873	15.690	covo *	eco ca	/ PO VD	£090 000 -
	,	15,680		\$62.63		\$982,038 ~
HMA SURFACE COURSE ( 2.0 HMA TOP BINDER COURSE ( 2.2 HMA LOWER BINDER COURSE ( 10.2	5") - DDA.	1,760 1,990 9,196	TONS	\$113.60 \$96.95 \$65.35	/TON	\$0 \$0 \$0
HMA SHOULDER (8.0	0*)		TONS LIN FT	\$72.00 \$30.00	/TON /LIN FT	\$56,197 - \$0
SUBBASE GRAN MATL TY C (TONS) IMPROVED SUBGRADE: Aggreg	ate Washing Ship		TONS SQ YD	\$25.00 \$7.00		\$15,150 \$127,162
Reserved For User Supplied Item Reserved For User Supplied Item			UNITS UNITS		/UNITS /UNITS	\$0 \$0
PAVEMENT REMOVAL SHOULDER REMOVAL		15,680 1,742		\$15.00 \$10.00		\$235,200 \$17,420
Note: * Denotes User Supplied Quantity				N INITIAL COST COST PER MILE		\$1,433,167 \$157,462
MAINTENANCE COSTS: ITEM THICKNE	SS	MATERIAL	Ţ	UNIT COST		
ROUTINE MAINTENANCE ACTIVITY		1 1		\$0.00	LANE-MILI	E/YEAR
HMA OVERLAY PVMT SURF (2.0		Surface Mix	2.40		/SQ YD	
HMA OVERLAY PVMT (3.7 HMA SURFACE MIX (1.5	<b>0")</b> 16697	Surface Mix	5.7% 1.53	\$9.56	/SQ YD	
HMA BINDER MIX (2.2 HMA OVERLAY SHLD (Year 30) (1.7		Top Binder Mix Shoulder Mix	2012A 3070		/SQ YD	
HMA OVERLAY SHLD (2.0		Shoulder Mix	2.55		/SQ YD	
MILLING (2.00 IN)			11.190	\$3.00	/ SQ YD	
PARTIAL DEPTH PVMT PATCH (Mill & Fill : PARTIAL DEPTH SHLD PATCH (Mill & Fill :		Surface Mix Shoulder Mix			/ SQ YD / SQ YD	
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.) PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.)		eling Binder Mix Shoulder Mix			/SQYD /SQYD	
LONGITUDINAL SHOULDER JOINT ROUT & SEA CENTERLINE JOINT ROUT & SEAL RANDOM / THERMAL CRACK ROUT & SEAL		= 110.00 / Static	on / Lane)	\$2.00	/LINFT /LINFT /LINFT	

#### FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY UN	NIT UNIT COST	COST	PRESENT WORTH
		~~~~~~~~~				
YEAR 5	LONG SHLD JT R&S	100.00%	3,920 LIN	IFT \$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800 LIN		\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468 LIN		\$12,936	
	PD PVMT PATCH M&F SURF	0.10%	16 SQ	YD \$82.72	\$1,324	
	PWF	n = 0.8626		PW = 0.8626	X \$41,700	\$35,971
YEAR 10					<u> </u>	
12/11/10	LONG SHLD JT R&S	100.00%	3,920 LIN	VFT \$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800 LIN		\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468 LIN		\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78 SQ		\$6,452	*****
	PWF	n = 0.7441		PW = 0.7441	X \$46,828	\$34,844
YEAR 15						
	MILL PVMT & SHLD 2.00"	100.00%	17,422 SQ		\$52,266	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	157 SQ		\$12,695	
	HMA OVERLAY PVMT 2.00"	100.00%	15,680 SQ		\$199,962	
	HMA OVERLAY SHLD 2.00 " PWF.	100.00% n = 0.6419	1,742 SQ	YD \$8.06 PW = 0.6419	\$14,049 X X \$278,972	\$179,062
		0.0413		111 - 0.0413	X	Ψ,13,002
YEAR 20						
	LONG SHLD JT R&S	100.00%	3,920 LIN		\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800 LIN		\$19,600	
	RNDM / THRM CRACK R&S PD PVMT PATCH M&F SURF	50.00% 0.10%	6,468 LIN 16 SQ		\$12,936 \$1,324	
	PWF			PW = 0.5537		\$23,088
	7		•			
YEAR 25	LONG SHLD JT R&S	100.00%	3,920 LIN	IFT \$2.00	\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800 LIN		\$19,600	
	RNDM / THRM CRACK R&S	50.00%	6,468 LIN		\$12,936	
	PD PVMT PATCH M&F SURF	0.50%	78 SQ		\$6,452	
	PWF	n = 0.4776		PW = 0.4776	X \$46,828	\$22,365
YEAR 30	HMA_SD INTERSTATE					
	MILL PVMT ONLY 2.00"	100.00%	15,680 SQ	YD \$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	314 SQ		\$25,390	
	PD SHLD PATCH M&F SURF 2.00"	1.00%	17 SQ	YD \$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75 "	100.00%	15,680 SQ		\$342,591	
	HMA OVERLAY SHLD 1.75 "	100.00%	1,742 \$Q		\$12,293	#47C FO4
	PWF	n = 0.4120		PW = 0.4120	X \$428,641	\$176,594
YEAR 35			<u> </u>	<u> </u>		
	LONG SHLD JT R&S	100.00%	3,920 LIN		\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800 LIN		\$19,600	
:	RNDM / THRM CRACK R&S	50.00%	6,468 LIN		\$12,936	
•	PD PVMT PATCH M&F SURF	0.10% n = 0.3554	16 SQ	YD \$82.72 PW = 0.3554	\$1,324 J X \$41,700	\$14,819
		0.0004		0.0004	X	Ģ14,515
YEAR 40						
	LONG SHLD JT R&S	100.00%	3,920 LIN		\$7,840	
	CNTR LINE JOINT R&S	100.00%	9,800 LIN		\$19,600	
	RNDM / THRM CRACK R&S PD PVMT PATCH M&F SURF	50.00% 0.50%	6,468 LIN 78 SQ		\$12,936 \$6,452	
	PWF		10 302	PW = 0.3066		\$14,355
•					*	
					· ·	\$501,098
	ROUTINE MAINTENANCE ACTIVITY		2.23 Lar	ne Miles 0.00	\$0	\$0
				MAINTENANCE LIFE		\$501,098
45	YEAR LIFE CYCLE CRFn = 0.	0407852	MAINT	TENANCE ANNUAL C	OST PER MILE	\$55,056

PCC PAVEMENT JPCP

ROUTE SECTION COUNTY LOCATION	I-290 N		r Morgan St 2013-012R Cook Interchange				
FACILITY TYPE		11	NTERSTATE				
PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH PCC PCC Total Wid	Left Right th of Paved Should	ders	5 6 2 12 4 4	FT ==> CL LANES EP FT FT FT	0.37	Miles	: : :
PAVEMENT THICKNESS (RIGID) SHOULDER THICKNESS		JPCP	11.00 11.00		TIED SHLD		•
POLICY OVERLAY THICKNESS			3.75	IN			
RIGID PAVEMENT TRAFFIC FACTO	ORS		MINIMUM		ACTUAL		USE
Worksheet Construction Type is	Reconstruction		8.26		37.44 vement Type is		37.44 JPCP
••					.ve.iieiit 13pe ie		0, 0,
INITIAL COSTS ITEM	THICKNESS	100%	QUANTITY	UNIT	UNIT PRICE		COST
JPC PAVEMENT	( 11.00" )	•	15,680	SO YD	\$47.42	/SQ YD	\$743,546
PAVEMENT REINFORCEMENT STABILIZED SUBBASE	(4.00")			SQ YD	\$22.00 \$19.00	/ SQ YD	\$0 \$310,327
PCC SHOULDERS CURB & GUTTER		: .	Ť.	SQ YD LIN FT	\$40.00 \$30.00	/SQ YD /LIN: FT	\$69,680 \$0
SUBBASE GRAN MATL TY C IMPROVED SUBGRADE:	(~ 1.72") Aggregate	Vidin a sit d	235 17,640	TONS SQ YD	\$25.00 \$7.00	/TON /SQYD	\$5,875 \$123,480
Reserved For User Supplied Item Reserved For User Supplied Item				UNITS UNITS		/ UNITS / UNITS	\$0 \$0
PAVEMENT REMOVAL SHOULDER REMOVAL			15,680 1,742		\$15.00 \$10.00	/SQYD /SQYD	\$235,200 \$17,420
Note: * Denotes User Supplied Quant	iity	RIGID CON			N INITIAL COST COST PER MILE		\$1,505,528 \$165,413
MAINTENANCE COSTS: ITEM	THICKNESS	-	MATERIAL	199	UNIT COST		
ROUTINE MAINTENANCE ACTIVITY				1 1	\$0.00	/ LANE-MIL	E/YEAR
HMA POLICY OVERLAY	( 3.75" )			5.75	•		
HMA POLICY OVERLAY PVMT	(3.75")	1 (96)(8)	***	3.79		/ SQ YD	•
HMA SURFACE MIX HMA BINDER MIX	( 1.50" ) ( 2.25" )	10901	Surface Mix Top Binder Mix	1.80 2.08		/SQ YD	
HMA POLICY OVERLAY SHLD	(3.75")		Shoulder Mix			/SO YD	1
CLASS A PAVEMENT PATCHING CLASS B PAVEMENT PATCHING	:				\$195.00 \$150.00		
CLASS C SHOULDER PATCHING					\$145.00	/ SQ YD	
PARTIAL DEPTH PVMT PATCH (Mill PARTIAL DEPTH PVMT PATCH (Mill		)	Surface Mix Surface Mix	1,87 1,80		/SQYD /SQYD	
LONGITUDINAL SHOULDER JOINT R CENTERLINE JOINT ROUT & SEAL REFLECTIVE TRANSVERSE CRACK				1	\$2.00	/LIN FT /LIN FT /LIN FT	
RANDOM CRACK ROUT & SEAL		hab = 100.00°/	Station / Lane)			/ LIN FT	

#### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

							PRESENT
MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST	COST	WORTH
YEAR 1							
	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn =	0.7441		PW =	0.7441 X	\$2,400	\$1,786
VEAD 4	E						
YEAR 1	PAVEMENT PATCH CLASS B	0.20%	21	SQ YD	\$150.00	C4 CED	
	PWFn =	0.6419	31	PW =	0.6419 X	\$4,650 \$4,650	\$2,985
	FVVFII -	0.0419		- VV -	0.0419 ^	φ4,000	\$2,860
YEAR 2	0		***************************************	***************************************			
<u> </u>	PAVEMENT PATCH CLASS B	2.00%	314	SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%		SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%		LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	PWFn =	0.5537		PW =	0.5537 X	\$75,845	\$41,994
YEAR 2	51						
12/11/ 2	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%		SQ YD	\$145.00	\$2,465	
	PWFn=	0.4776		PW =	0.4776 X		\$34,848
	NAME OF THE PROPERTY OF THE PR			•			
YEAR 3				22142	*****		
	PAVEMENT PATCH CLASS B	4.00%		SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%		SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%		SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)  PWFn =	100.00%	1,142	SQ YD PW =	\$15.12 0.4120 X	\$26,342 } \$466,753	\$102.200
	FVVFit -	0.4120		FVV -	U.412U A	. \$400,700	\$192,296
YEAR 3	5 INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%		LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%		LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%		LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn =	0.3554		PW ≂	0.3554 X	\$48,019	\$17,065
YEAR 4	INTERSTATE						
	PAVEMENT PATCH CLASS B	0.50%	78	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
ė.	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%		LIN FT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%		LIN FT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%	78	SQ YD	\$79.54	\$6,204	
	PWFn =	0.3066		PW =	0.3066 X	\$68,422	\$20,975
	·						\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
				MAINT	ENANCE LIFE-0	CYCLE COST	\$311,949
4	5 YEAR LIFE CYCLE CRFn = 0.040	7852	M	AINTENANC	E ANNUAL CO	ST PER MILE	\$34,274

LIFE-CYCL	E COST ANALYSIS:	NEW DESIGN	Calculated / Rev	sed: 9/23/14 8:02	AM
				IPCP	НМА
CONSTRUCTION	INITIAL COST	PRESENT WOR ANNUAL COST PER M			33,167 57,462
MAINTENANCE	LIFE-CYCLE COST	PRESENT WOR ANNUAL COST PER M		•	01,098 55,056
TOTAL	LIFE-CYCLE COST	PRESENT WOR ANNUAL COST PER M			34,265 12,518
LIFE-CYCL	E COST ANALYSIS:	FINAL SUMMARY			
LOWEST COST OPT	ION ======		=> .	IPCP \$19	99,687
OTHER OPTIONS (LC	OWEST TO HIGHEST):	TYPE / PERCENTA	GE.	HMA \$2	12,518 6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[Adams St Ramp IDOT Mechanistic.xlsm]LifeCycleCost

5401 Template (Rev. 09/05/2013) IDO	T MECHAI	NISTIC PAVEN	MENT DE	SIGN			Printed:	08/26/2019
	<b>PROJECT</b>	AND TRAFFI	C INPUT	S	(Enter Data	in Gray Shad	ed Cells)	
Route: Jackson Blvd. Ramps at I-90/94 Section: 2015-019R	Comments:	Circle Interchange	Project Conti	ract 62A76 &	62A77			
County: Cook	Design Date:	08/02/2019	ONP	< BY				
Location: Circle Interchange	Modify Date:			< BY	ADT	Year		
				Current:	3,800	2012		
Facility Type Interstate or Freeway	3	** Ramp Design Fi	g. 54-1.B **	Future:	6,000	2040		
# of Lanes =	1 Lane Ramp	Crossroad?	Unmarked S	tate Route				
		# of Lanes =	4		Structural D	esign Traffic		
				Minimum	Actual	Actual %of	% of A	DT in
Road Class:	: I	_		ADT	ADT	Total ADT	Design	Lane
	مستعدد والمستور والمعارض والمستعدد الخراري الخوار والان والراء		PV =	0	4,901	94.0%	P=	100%
Subgrade Support Rating (SSR):	Poor		SU =	250	209	4.0%	S=	100%
Construction Year:	2020		MU =	750	104	2.0%	M =	100%
Design Period (DP) =	20	years	Struct. D	esign ADT =	5,214	(2030)		
		TRAFFIC FA	CTOR CAL	CULATION	<u>1</u>			
FLEXIBLE	PAVEMENT	RAMP DESIG	N MIN	RIGID PAVEMENT		T RAMP DESIGN MIN		
Cpv =	0.15	0.15	50%		Cpv =	0.15	0.15	50%
Csu =	132.5	112.06	50%		Csu =	143.81	135.78	50%
Cmu =	482.53	385,44	50%		Cmu =	696.42	567.21	50%
TF flexible (Actual) =	1.57	(Actual ADT)	3.17	TF rig	id (Actual) =	2.07	(Actual ADT)	4.59
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2	.C)	TF	rigid (Min) =	4.59	(Min ADT Fig.	54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS				
Full-Depth HMA Pavement	JPC Pavement			
Use TF flexible = 3.17 PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 4.59 Edge Support = Tied Shoulder or C.&G.			
Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)  Design HMA Mixture Modulus (E _{HMA} ) = 710 ksi (Fig. 54-5.D)	Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)			
Design HMA Strain (ε _{HMA} ) = 86 (Fig. 54-5.Ε)	CRC Pavement			
Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)  Goto Map  Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 4.59 IBR value = 3			
Use Full-Depth HMA Thickness = 10.00 inches	CRCP Thickness = 8.00 in. (Fig. 54-4.M)			

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS				
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay			
Use TF flexible = 3.17  HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)  Goto Map  Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.			
Use HMA Overlay Thickness = 7.25 inches	JPCP Thickness = NA inches			

CONTACT BMPR FOR ASSISTANCE

# DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)
One-way Streets with ADT > 3500			

	Min. Str. Design Traffic (Fig 54-2.C)			
Facility Type	PV	SU*	MU*	
Interstate or Freeway	0	500	1500	
Other Marked State Route	0	250	750	
Unmarked State Route	0	250	750	

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients				
	Rigid (	Fig. 54-4.C)	Flexible (Fig. 54-5.B		
Class	Csu	Cmu	Csu	Сmu	
	143.81	696.42	132.50	482.53	
11	135.78	567 <i>.</i> 21	112.06	385.44	
111	129.58	562.47	109.14	384.35	
IV	129.58	562.47	109.14	384.35	

Class Table for One-Way Streets		
ADT	Class	
0 ~ 3500	il.	
>3501	1	

Class Table for						
2 or 3 lanes						
(not future 4 lane &						
not one-way street)						
ADT	Class					
0 - 749	ΙV					
750 - 2000   111						
>2000	11					

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)						
		Rural	Urban				
Number of Lanes	Ρ	Ş	M	Р	\$	M	
1 Lane Ramp	100%	100%	100%	100%	100%	100%	
2 or 3	50%	50%	50%	50%	50%	50%	
4	32%	45%	45%	32%	45%	45%	
6 or more	20%	40%	40%	8%	37%	37%	

BDE 5401 Template (Rev. 09/05/2013)

#### Printed: 08/26/2019

# LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

# **FULL-DEPTH HMA PAVEMENT**

## Standard Design

ROUTE I-290	Mainline near Morgan St				
SECTION COUNTY	2013-012R Cook				
LOCATION	Circle Interchange				
FACILITY TYPE	INTERSTATE				
PROJECT LENGTH	1000	FT ==>	0.37	Miles	
# OF CENTERLINES		CL	0.37	ivilles	
# OF LANES		LANES			
# OF EDGES LANE WIDTH - AVERAGE		EP FT			
SHOULDER WIDTH HMA Left		Π			
HMA Right Total Width of Paved Sho		FT FT			
Total White of Page Shot	nucis o	FI			
PAVEMENT THICKNESS (FLEXIBLE)	14.50	IN	14,75	IN MAX	
SHOULDER THICKNESS	8.00		5554 SE	Standard	l Design
POLICY OVERLAY THICKNESS	3.75	IN			
FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM		ACTUAL		USE
	5.85		26.89		26.89
NAMES AND STREET AND ADDRESS A					Read Mel
HMA COST PER TON HMA SURFACE			UNIT PRICE		
HMA TOP BINDER			\$113.60 \$96.95		
HMA LOWER BINDER			\$65.35		
HMA BINDER (LEVELING) HMA SHOULDER			\$96.95		3
Section de des de la companya del companya de la companya del companya de la companya del companya de la companya de la companya de la companya del companya de la companya	erende men men men men erende erende erende bestelle bestelle bestelle bestelle bestelle bestelle bestelle bes	eta gigazit, il setermazian	\$72.00	TION	
INITIAL COSTS					
ITEM THICKNESS	100% QUANTITY	UNIT	UNIT PRICE		cost
				-	
HMA PAVEMENT (FULL-DEPTH) (14.50°)	15,680	SQ YD	\$62.63	/SQ YD	\$982,038 ~
HMA SURFACE COURSE (2.00")	1,760		\$113.60		\$0
HMA TOP BINDER COURSE (2.25*) HMA LOWER BINDER COURSE (10.25*)	1,990 1,990 1,9972 9,196		\$96.95 \$65.35		\$0 \$0
\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.		.1010	900.00	,	
HMA SHOULDER (8.00*)	781	TONS	\$72.00	/TON	\$56,197 <i>~</i>
CURB & GUTTER		LIN FT		/LIN FT	\$0
SUBBASE GRAN MATL TY C (TONS)	606	TONS	\$25.00	/TON	\$15,150
IMPROVED SUBGRADE: Aggregate	VATO 1 / 6 B P	\$Q YD	\$7.00	/ SQ YD	\$127,162
Reserved For User Supplied Item		UNITS		/ UNITS	\$0
Reserved For User Supplied Item	υ	UNITS	\$0.00	/ UNITS	\$0
PAVEMENT REMOVAL SHOULDER REMOVAL	15,680 1,742		\$15.00 \$10.00		\$235,200 \$17,420
			,	100.10	
Note: * Denotes User Supplied Quantity FL	FLEXIBLE CONS EXIBLE CONSTRUCTION				\$1,433,167 \$157,462
MAINTENANCE COSTS:					
THICKNESS	MATERIAL	-	UNIT COST		
ROUTINE MAINTENANCE ACTIVITY			\$0.00	LANE-MILE	/YEAR
HMA OVERLAY PVMT SURF (2.00*)	Surface Mix	N 11/1	\$12.75	/ SQ YD	
HMA OVERLAY PVMT (3.75")	1000	1.25	\$21.85	/SQ YD	
HMA SURFACE MIX (1.50") HMA BINDER MIX (2.25")	Surface Mix	1.65%		/SQ YD	
HMA BINDER MIX (2.25*) HMA OVERLAY SHLD (Year 30) (1.75*)	Top Binder Mix Shoulder Mix			/ SQ YD	
HMA OVERLAY SHLD (2.00")	Shoulder Mix	alas		/SQYD	
MILLING (2.00 IN)		230	\$3.00	/ SQ YD	
PARTIAL DEPTH PVMT PATCH (Milk & Fill Surf)	Surface Mix	2.05	<b>\$</b> 92.72	160.50	
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)	Shoulder Mix	159	\$82.72 \$78.06		
PARTIAL DEPTH_PVMT_PATCH (Mill & Fill +2.00 *)	Leveling Binder Mix	Section 1	\$80.86	/SQ YD	
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00 *)	Shoulder Mix		\$78.06		
LONGITUDINAL SHOULDER JOINT ROUT & SEAL		•	\$2 BN	/LINFT	
CENTERLINE JOINT ROUT & SEAL				/LINFT	
RANDOM / THERMAL CRACK ROUT & SEAL	(100% Rehab = 110.00' / Static	on / Lane)		/ LIN FT	

#### FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

		STA	NDARD DES	IGN				
MAINTENANCE COSTS:	ITEM		%	QUANTITY	UNIT	UNIT COST	COST	PRESENT WORTH
VEAD E								
YEAR 5	LONG SHLD JT R&S		100.00%	3 030	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S							
	RNDM / THRM CRACK R&S		100.00%		LIN FT	\$2.00	\$19,600	
			50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	BULE	0.10%	16	SQ YD	\$82.72	\$1,324	***
		PWFn =	0.8626		PW =	0.8626	X \$41,700	\$35,971
YEAR 10		***************************************						
12/115 70	LONG SHLD JT R&S		100.00%	3 920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.50%		SQYD			
	FDF VMT FATOIT MAR SORE	- PWFn =	0.7441	70	PW =	\$82.72 0.7441	\$6,452 X \$46,828	\$34,844
		1 111 11			. ,, –	0.7441	Λ ψ40,020	φυ,υ
YEAR 15								
	MILL PVMT & SHLD 2.00"		100.00%	17,422	SQ YD	\$3.00	\$52,266	
	PD PVMT PATCH M&F ADD'L 2.0	)O*	1.00%	157	SQ YD	\$80.86	\$12,695	
	HMA OVERLAY PVMT 2.00"		100.00%	15,680	SQ YD	\$12.75	\$199,962	
	HMA OVERLAY SHLD 2.00 "		100.00%		SQ YD	\$8.06	\$14,049	
		PWFn =	0.6419	•	PW =	0.6419		\$179,062
	·							
YEAR 20			*******		1111			
	LONG SHLD JT R&S		100.00%	•	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.10%	16	SQ YD	\$82.72	\$1,324	
		PWFn =	0.5537		PW ≂	0.5537	X \$41,700	\$23,088
YEAR 25	<u> </u>							
[ TEAR 25	LONG SHLD JT R&S		100.00%	3 920	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LINFT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LINFT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.50%		SQ YD	\$82.72	\$6,452	
	I D I VIII I / II	PWFn =	0.4776		PW =	0.4776		\$22,365
-	HMA_SD		0,0			0.4110	Α Ψ40,020	ψ22,00 <b>0</b>
YEAR 30	INTERSTATE							
	MILL PVMT ONLY 2.00"		100.00%	15,680	SQ YD	\$3.00	\$47,040	
	PD PVMT PATCH M&F ADD'L 2.0	10"	2.00%		SQ YD	\$80.86	\$25,390	
	PD SHLD PATCH M&F SURF 2.0		1.00%		SQ YD	\$78.06	\$1,327	
	HMA OVERLAY PVMT 3.75"	-	100.00%	15,680		\$21.85	\$342,591	
	HMA OVERLAY SHLD 1,75 "		100.00%		SQ YD	\$7.06	\$12,293	
		PWFn=	0.4120	1,1 42	PW =	0.4120		\$176,594
								******
YEAR 35								
	LONG SHLD JT R&S		100.00%		LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RNDM / THRM CRACK R&\$		50.00%	6,468	LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF		0.10%	16	SQ YD	\$82.72	\$1,324	
		PWFn =	0.3554		PW=	0.3554	X \$41,700	\$14,819
VEAD 40	<del></del>					<u> </u>	· · · · · · · · · · · · · · · · · · ·	
YEAR 40	LONG SHLD JT R&S		100.00%	3 030	LIN FT	\$2.00	\$7,840	
	CNTR LINE JOINT R&S		100.00%		LIN FT	\$2.00 \$2.00		
							\$19,600	
	RNDM / THRM CRACK R&S		50.00%		LIN FT	\$2.00	\$12,936	
	PD PVMT PATCH M&F SURF	PWFn=	0.50%	78	SQ YD PW ≖	\$82.72 0.3066	\$6,452	614 255
		E VV FIX -	0.5000		PVV =	0.3066	X \$46,828	\$14,355
				1.	1.		-	\$501,098
							*	
	ROUTINE MAINTENANCE ACTIVIT	Υ		2.23	Lane Miles		\$0	\$0
45	YEAR LIFE CYCLE CRI	Fn = 0.0407	852	NA A			E-CYCLE COST OST PER MILE	\$501,098 \$55,056
[ 40	,	, ,, – 0.0407		IATA		OF VISISOUF O	OO I FEIT WILE	400,000

**PCC PAVEMENT** ROUTE I-290 Mainline near Morgan St SECTION 2013-012R COUNTY Cook LOCATION Circle Interchange FACILITY TYPE INTERSTATE PROJECT LENGTH 1960 FT ==> # OF CENTERLINES 5 CL # OF LANES 6 LANES # OF EDGES 2 EP LANE WIDTH - AVERAGE 12 FT SHOULDER WIDTH PCC Lett 4 FT PCC Right 4 FT Total Width of Paved Shoulders 8 FT PAVEMENT THICKNESS (RIGID) SHOULDER THICKNESS JPCP 11.00 IN TIED SHLD 11.00 IN POLICY OVERLAY THICKNESS 3.75 IN RIGID PAVEMENT TRAFFIC FACTORS MINIMUM

RIGID PAVEMENT TRAFFIC FACTO	RS	MINIMUM		ACTUAL	USE
Worksheet Construction Type is	Reconstruction	8.26		37.44 Pavement Type is	37.44 JPCP
INITIAL COSTS ITEM	THICKNESS	100% QUANTITY	UNIT	UNIT PRICE	COST
JPC PAVEMENT PAVEMENT REINFORCEMENT STABILIZED SUBBASE	( 11.00" ) ( 4.00" )	15,680 0 16,333	SQYD	\$47.42 /SQ YD \$22.00 /SQ YD \$19.00 /SQ YD	\$743,546 \$0 \$310,327
PCC SHOULDERS CURB & GUTTER			SQ YD LIN FT	\$40.00 /SQYD \$30.00 /LIN FT	\$69,680 \$0
SUBBASE GRAN MATL TY C IMPROVED SUBGRADE:	(~ 1.72") Aggregate Wildth wit		TONS SQ YD	\$25.00 /TON \$7.00 /SQYD	\$5,875 \$123,480
Reserved For User Supplied Item Reserved For User Supplied Item			UNITS	\$0.00 / UNITS \$0.00 / UNITS	\$0 \$0
PAVEMENT REMOVAL SHOULDER REMOVAL		15,680 1,742	SQ YD SQ YD	\$15.00 /SQYD \$10.00 /SQYD	\$235,200 \$17,420
Note: * Denotes User Supplied Quanti	•			ION INITIAL COST L COST PER MILE	\$1,505,528 \$165,413

vote. Denotes Oser Supplied Quantity	RIGID CONSTRUCTION IN
	RIGID CONSTRUCTION ANNUAL COS

0.37 Miles

MAINTENANCE	COSTS:

ITEM	THICKNESS		MATERIAL		UNIT COST	•
ROUTINE MAINTENANCE ACTIVITY					\$0.00	/LANE-MILE/YEAR
HMA POLICY OVERLAY	(3.75")			5,70		
HMA POLICY OVERLAY PVMT	(3.75")	1,0043		9.78	\$21.85	/SQ YD
HMA SURFACE MIX	(1.50")	4.00 (2	Surface Mix	1.450	\$9.56	/SQ YD
HMA BINDER MIX	( 2.25" )	1,000.5	Top Binder Mix	0.08	\$12.29	/SQ YD
HMA POLICY OVERLAY SHLD	(3.75")		Shoulder Mix	3,75	\$15.12	/SQ YD
CLASS A PAVEMENT PATCHING					\$195.00	/ SQ YD
CLASS B PAVEMENT PATCHING			1		\$150.00	
CLASS C SHOULDER PATCHING					\$145.00	/SQ YD
PARTIAL DEPTH PVMT PATCH (Mill &	Fill HMA Surf)		Surface Mix	1.80	\$79.54	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill 8	Fill HMA 1.50")		Surface Mix	1.5%	\$79.54	/ SQ YD
LONGITUDINAL SHOULDER JOINT RO	UT & SEAL				\$2.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL					\$2.00	/ LIN FT
REFLECTIVE TRANSVERSE CRACK R	OUT & SEAL				\$2.00	/ LIN FT
RANDOM CRACK ROUT & SEAL	(100% Refi	ab = 100,00	)' / Station / Lane)		\$2.00	/ LIN FT

#### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

MANUTENANOE OCCTO	TTT.		*****					PRESENT
MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNII	UNIT COST		COST	WORTH
YEAR 10	1							
1 1211	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00		\$2,400	
	PWFn=	0.7441	10	PW =	0.7441	х	\$2,400	\$1,786
		••••			•		4.2,	¥ 1,1.00
YEAR 15		***************************************						
-	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00		\$4,650	
	PWFn =	0.6419		PW =	0.6419	Х	\$4,650	\$2,985
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%		SQ YD	\$150.00		\$47,100	
	SHOULDER PATCH CLASS C	0.50%		SQ YD	\$145.00		\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%		LINFT	\$2.00		\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00		\$19,600	644.004
	PWFn =	0.5537		PW =	0.5537	Х	\$75,845	\$41,994
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	470	SQ YD	\$150.00		\$70,500	
	SHOULDER PATCH CLASS C	1.00%		SQ YD	\$145.00		\$2,465	
	PWFn =	0.4776		PW =	0,4776	Х	\$72,965	\$34,848
								` .
YEAR 30								
	PAVEMENT PATCH CLASS B	4.00%		SQ YD	\$150.00		\$94,050	
	SHOULDER PATCH CLASS C	1.50%		SQ YD	\$145.00		\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%		SQ YD	\$21.85		\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00%	1,742	SQ YD	\$15.12		\$26,342	
	PWFn =	0.4120		PW =	0.4120	Х	\$466,753	\$192,296
YEAR 35	INTERSTATE							
[	LONGITUDINAL SHLD JT R&S	100.00%	3 020	LIN FT	\$2.00		\$7,840	
	CENTERLINE JT R&S	100.00%		LIN FT	\$2.00		\$19,600	
	RANDOM CRACK R&S	50.00%		LINFT	\$2.00		\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%		LIN FT	\$2.00		\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%		SQ YD	\$79.54		\$1,273	
	PWFn =	0.3554		PW =	0.3554	Х	\$48,019	\$17,065
	,							
YEAR 40								
•	PAVEMENT PATCH CLASS B	0.50%		SQ YD	\$150.00		\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%		LIN FT	\$2.00		\$7,840	
	CENTERLINE JT R&S	100.00%		LIN FT	\$2.00		\$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%		LIN FT	\$2.00		\$11,318	
	RANDOM CRACK R&S	50.00%		LIN FT	\$2.00		\$11,760	
	PWFn =	0.50% 0.3066		SQ YD PW =	\$79.54 0.3066	· v	\$6,204 \$68,422	\$20,975
	LAALII -	0.5000		r vv -	0.5000	^	^{\$00,422} —	\$311,949
								ψυ ( I ₁ υ43
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00		\$0	\$0
				MAINT	ENANCE LIFE	E-CY	CLE COST	\$311,949
45	YEAR LIFE CYCLE CRFn = 0.040	7852	MA	AINTENANO	CE ANNUAL C	OST	PER MILE	\$34,274

LIFE-CYCL	E COST ANALYSIS:	NEW DESIGN Cald	culated / Revised :	9/23/14 8:02 AM	
		•	JPCP	НМА	
CONSTRUCTION	INITIAL COST	PRESENT WORTH	\$1,505,528	\$1,433,167	
		ANNUAL COST PER MILE	\$165,413	\$157,462	
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	\$311,949	\$501,098	
		ANNUAL COST PER MILE	\$34,274	\$55,056	
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	\$1,817,477	\$1,934,265	
		ANNUAL COST PER MILE	\$199,687	\$212,518	
LIFE-CYCL	E COST ANALYSIS:	FINAL SUMMARY			
LOWEST COST OPT	TON =======		JPCP	\$199,687	
OTHER OPTIONS (L	OWEST TO HIGHEST):	TYPE / PERCENTAGE	НМА	\$212,518	6.4%

 $S:\label{localization} S:\label{localization} S:\label{localizatio$ 

#### **IDOT MECHANISTIC PAVEMENT DESIGN** Printed: 08/26/2019 PROJECT AND TRAFFIC INPUTS

Route: Roosevelt Road Ramps at I-90/94 Comments: Circle Interchange Project Contract 62A76 & 62A77

Section: 2015-019R

County: Cook Design Date: 08/02/2019 ONP <-- BY Location: Circle Interchange Modify Date: <-- BY ADT Year

Current: 4,400 2012 Facility Type Interstate or Freeway ** Ramp Design Fig. 54-1.B ** Future: 6,000 2040

Crossroad? Unmarked State Route # of Lanes = 1 Lane Ramp # of Lanes =

Road Class: 1

Subgrade Support Rating (SSR): Poor Construction Year: 2020 Design Period (DP) = 20 years

4		Structural I	Design Traffic			
Minimu		Actual	Actual %of	% of ADT in		
	ADT	ADT	Total ADT	Design L	ane	
PV=	0	4,994	92.0%	P=	100%	
SU =	250	217	4.0%	S =	100%	
MU =	750	217	4.0%	M =	100%	
Struct, D	esian ADT =	5.429	(2030)			

(Enter Data in Gray Shaded Cells)

#### TRAFFIC FACTOR CALCULATION

		IRAFFIC F	ACTOR CAL	CULATION			
FLEXIBLE PAVEMENT		RAMP DESIGN MIN		RIGID PA	RAMP DESIGN MIN		
Cpv =	0.15	0.15	50%	Cpv =	0.15	0.15	50%
Csu =	132.5	112.06	50%	Csu =	143.81	135.78	50%
Cmu =	482.53	385.44	50%	Cmu =	696.42	567.21	50%
TF flexible (Actual) =	2.69	(Actual ADT)	3.17	TF rigid (Actual) =	3.66	(Actual ADT)	4.59
TF flexible (Min) =	3.17	(Min ADT Fig. 54-	2.C)	TF rigid (Min) =	4.59	(Min ADT Fig.	54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEM	ENT DESIGN CALCULATIONS
Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 3.17  PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)  Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)	Use TF rigid = 4.59 Edge Support = Tied Shoulder or C.&G. Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)
Design HMA Mixture Modulus ( $E_{HMA}$ ) = 710 ksi (Fig. 54-5.D)  Design HMA Strain ( $\varepsilon_{HMA}$ ) = 86 (Fig. 54-5.E)	CRC Pavement
Goto Map  Full Depth HMA Design Thickness = 10.00 in. (Fig. 54-5.F)  Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 4.59 IBR value = 3
Use Full-Depth HMA Thickness = 10.00 inches	CRCP Thickness = 8.00 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEN	IENT DESIGN CALCULATIONS
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay
Use TF flexible = 3.17  HMA Overlay Design Thickness = 7.25 in. (Fig. 54-5.U)  Goto Map  Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.
Use HMA Overlay Thickness = 7.25 inches	JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

# DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

- AI TE			
Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)
One-way Streets with ADT > 3500	•	<b>,</b>	,,

	Min. Str. Design Traffic (Fig 54-2.C)			
Facility Type	PV	SU*	MU*	
Interstate or Freeway	0	500	1500	
Other Marked State Route	0	250	750	
Unmarked State Route	0	250	750	

* Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients					
	Rigid (	Fig. 54-4.C)	Ffexible (Fig. 54-5.B)			
Class	Csu	Cmu	Csu	Cmu		
	143.81	696.42	132.50	482.53		
1)	135.78	567.21	112.06	385,44		
111	129.58	562.47	109.14	384.35		
IV	129.58	562.47	109.14	384.35		

Class Table for			
One-Way Streets			
ADT	Class		
0 - 3500	II.		
>3501	ì		

Class	able for			
2 or 3 lanes				
(not future 4 lane &				
not one-way street)				
ADT	Class			
0 - 749	Class IV			

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
		Rural	Urban			
Number of Lanes	Р	S	М	P	S	М
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

# LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## **FULL-DEPTH HMA PAVEMENT**

Standard Design

			_
SECTION COUNTY	290 Mainline near Morgan S 2013-012F Cool	₹ k	
LOCATION	Circle Interchange	9	
FACILITY TYPE	INTERSTATE	•	
PROJECT LENGTH # OF CENTERLINES # OF LANES # OF EDGES LANE WIDTH - AVERAGE SHOULDER WIDTH HMA Left HMA Right Total Width of Paved S	13	0 FT ==> 0.37 5 CL 5 LANES 2 EP 2 FT 4 FT 4 FT 3 FT	Miles
PAVEMENT THICKNESS (FLEXIBLE) SHOULDER THICKNESS POLICY OVERLAY THICKNESS	14.50 8.00 3.75	OIN SEAS	5 IN MAX Standard Design
FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM		
	5.85	5 26.89	
HMA COST PER TON		UNIT PRICE	Read Me!
HMA SURFACE HMA TOP BINDER HMA LOWER BINDER HMA BINDER (LEVELING) HMA SHOULDER	usi kadi dan anga kanamanan pertenan per utuka anga anga anga anga anga anga anga an	\$113.60 \$96.95 \$65.35 \$96.95 \$72.00	/TON /TON /TON
INITIAL COSTS ITEM THICKNE	SS 100% QUANTITY	UNIT UNIT PRICE	cost
	10070 407411111	0,411	
HMA PAVEMENT (FULL-DEPTH) (14.5)	15,680 "נ"	SQ YD * \$62.63	/SQYD \$982,038 -
HMA SURFACE COURSE (2.0) HMA TOP BINDER COURSE (2.2) HMA LOWER BINDER COURSE (10.2)	5") 1,990	TONS \$113.60 TONS \$96.95 TONS \$65.35	/TON \$0
HMA SHOULDER CURB & GUTTER	100 200 200 200 200 200 200 200 200 200	<del>maga aganga pangangang agang agang p</del> antan antan antan antan antan antan kalamatan kalamatan kalamatan kalamatan	/TON \$56,197 ~ /LIN FT \$0
SUBBASE GRAN MATL TY C (TONS) IMPROVED SUBGRADE: Aggreg	606 ate 1994 1995 118,166	TONS \$25.00 SQ YD \$7.00	/TON \$15,150 /SQ YD \$127,162
Reserved For User Supplied Item Reserved For User Supplied Item	=		/UNITS \$0 /UNITS \$0
PAVEMENT REMOVAL SHOULDER REMOVAL	15,680 1.742		/SQYD \$235,200 /SQYD \$17,420
Note: * Denotes User Supplied Quantity	FLEXIBLE CON	STRUCTION INITIAL COST	\$1,433,167
************	FLEXIBLE CONSTRUCTION	N ANNUAL COST PER MILE	\$157,462
MAINTENANCE COSTS: ITEM THICKNE	SS MATERIAL	. UNIT COST	
ROUTINE MAINTENANCE ACTIVITY		\$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF (2.00			/SQ YD
HMA OVERLAY PVMT (3.76 HMA SURFACE MIX (1.50			/SQYD
HMA BINDER MIX ( 2.25	Top Binder Mb	\$12.29	/ SQ YD
HMA OVERLAY SHLD (Year 30) (1.75 HMA OVERLAY SHLD (2.00			/SQYD /SQYD
MILLING (2.00 IN)		:A :::: \$3.00	/SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill S PARTIAL DEPTH SHLD PATCH (Mill & Fill S		: :	/SQYD /SQYD
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.0 PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.0			/SQYD /SQYD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL		\$2.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL RANDOM / THERMAL CRACK ROUT & SEAL	(100% Rehab = 110.00' / Stat	\$2.00	/ LIN FT / LIN FT

#### FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

PRESEN WORT	COST	NIT COST	UNIT L	QUANTITY	%		ITEM	NTENANCE COSTS:
						***************************************	1	YEAR 5
	\$7,840	\$2.00	IN FT	3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72	SQ YD		0.10%		PD PVMT PATCH M&F SURF	
\$35,97	\$41,700	0.8626 X	PW =		0.8626	PWFn =		
				water and the control of the control	and the state of t			YEAR 10
	\$7,840	\$2.00	IN FT	3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00	JN FT	9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00	IN FT	6,468	50.00%		RNDM / THRM CRACK R&S	
	\$6,452	\$82.72	SQ YD	78	0.50%		PD PVMT PATCH M&F SURF	
\$34,84	\$46,828	0.7441 X	PW =		0.7441	PWFn ≃		
								YEAR 15
	\$52,266	\$3.00		17,422	100.00%		MILL PVMT & SHLD 2,00"	
	\$12,695	\$80.86	SQ YD		1.00%	2.00"	PD PVMT PATCH M&F ADD'L	
	\$199,962	\$12.75		15,680	100.00%		HMA OVERLAY PVMT 2.00"	
	\$14,049	\$8.06		1,742	100.00%		HMA OVERLAY SHLD 2.00 "	
\$179,06	\$278,972	0.6419 X	PW =		0.6419	PWFn =		
								YEAR 20
	\$7,840	\$2.00		3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72	Q YD	16	0.10%		PD PVMT PATCH M&F SURF	
\$23,08	\$41,700	0.5537 X	PW =		0.5537	PWFn≖		
								YEAR 25
	\$7,840	\$2.00		3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
•00 00	\$6,452	\$82.72	SQ YD	78	0.50%	- But	PD PVMT PATCH M&F SURF	
\$22,36	\$46,828	0.4776 X	PW =		0.4776	PWFn =	HMA SD	
							INTERSTATE	YEAR 30
	\$47,040	\$3.00	SQ YD	15,680	100.00%		MILL PVMT ONLY 2.00"	
	\$25,390	\$80.86	SQ YD	314	2.00%	2.00"	PD PVMT PATCH M&F ADD'L	
	\$1,327	\$78.06	SQ YD	17	1.00%	2.00"	PD SHLD PATCH M&F SURF	
	\$342,591	\$21.85	SQ YD	15,680	100.00%		HMA OVERLAY PVMT 3.75 "	
	\$12,293	\$7.06	SQ YD	1,742	100.00%		HMA OVERLAY SHLD 1.75 "	
\$176,59	\$428,641	0.4120 X	PW =		0.4120	PWFn =		
								YEAR 35
	\$7,840	\$2.00	.IN FT	3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00	IN FT	9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00	IN FT	6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72	SQ YD	16	0.10%		PD PVMT PATCH M&F SURF	
\$14,81	\$41,700	0.3554 X	PW =		0.3554	PWFn =		
								YEAR 40
	\$7,840	\$2.00		3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
\$14,35	\$6,452 \$46,828	\$82.72 0.3066 X	PW =	78	0.50% 0.3066	PWFn =	PD PVMT PATCH M&F SURF	
\$14,55	\$40,020	0.3000 A			0.3000	FVVFII -		
	. —		-					
\$501,09								
\$501,09 \$	\$0	0.00	ane Miles	2.23	<u> </u>	IVITY	ROUTINE MAINTENANCE ACT	

**PCC PAVEMENT JPCP** 

ROUTE I-290 Mainline near Morgan St SECTION 2013-012R COUNTY Cook LOCATION Circle Interchange **FACILITY TYPE** INTERSTATE PROJECT LENGTH 1960 FT ==> 0.37 Miles # OF CENTERLINES 5 CL # OF LANES 6 LANES # OF EDGES 2 EP LANE WIDTH - AVERAGE 12 FT SHOULDER WIDTH PCC Left 4 FT PCC Right 4 FT Total Width of Paved Shoulders 8 FT PAVEMENT THICKNESS (RIGID) **JPCP** 11.00 IN TIED SHLD SHOULDER THICKNESS 11.00 IN POLICY OVERLAY THICKNESS 3.75 IN RIGID PAVEMENT TRAFFIC FACTORS MINIMUM ACTUAL USE 37 44 8.26 37 44 Worksheet Construction Type is Reconstruction The Pavement Type is JPCP **INITIAL COSTS** ITEM THICKNESS 100% QUANTITY UNIT **UNIT PRICE** COST JPC PAVEMENT (11.00") 15,680 SQ YD \$47.42 / SQ YD \$743,546 PAVEMENT REINFORCEMENT 0 SQYD \$22.00 / SQ YD STABILIZED SUBBASE (4.00") 16,333 SQ YD \$19.00 /SQ YD \$310,327 PCC SHOULDERS 1,742 SQ YD \$40.00 / SQ YD \$69,680 **CURB & GUTTER** 0 LIN FT \$30.00 / LIN FT \$0 SUBBASE GRAN MATL TY C ( ~ 1.72° ) 235 TONS \$25.00 /TON \$5,875 IMPROVED SUBGRADE: Aggregate White was to 17,640 SQ YD \$7.00 / SQ YD \$123,480 Reserved For User Supplied Item \$0.00 /UNITS 0 UNITS SD Reserved For User Supplied Item 0 UNITS \$0.00 / UNITS \$0 PAVEMENT REMOVAL 15,680 SQ YD \$15.00 / SQ YD \$235,200 SHOULDER REMOVAL 1,742 SQ YD \$10.00 / SQ YD \$17,420 Note: * Denotes User Supplied Quantity RIGID CONSTRUCTION INITIAL COST \$1,505,528 RIGID CONSTRUCTION ANNUAL COST PER MILE \$165,413 **MAINTENANCE COSTS: THICKNESS UNIT COST** ITEM MATERIAL ROUTINE MAINTENANCE ACTIVITY \$0.00 /LANE-MILE/YEAR HMA POLICY OVERLAY (3.75") HMA POLICY OVERLAY PVMT (3.75") \$21.85 / SQ YD (1.50") HMA SURFACE MIX \$9.56 / SQ YD Surface Mix HMA BINDER MIX \$12.29 / SQ YD Top Binder Mix HMA POLICY OVERLAY SHLD (3.75")\$15.12 / SQ YD Shoulder Mix CLASS A PAVEMENT PATCHING \$195.00 / SQ YD CLASS B PAVEMENT PATCHING \$150.00 /SQ YD CLASS C SHOULDER PATCHING \$145.00 / SQ YD PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf) Surface Mix \$79.54 / SO YD PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50") Surface Mix \$79.54 / SQ YD LONGITUDINAL SHOULDER JOINT ROUT & SEAL \$2.00 / LIN FT CENTERLINE JOINT ROUT & SEAL \$2.00 / LIN FT REFLECTIVE TRANSVERSE CRACK ROUT & SEAL

(100% Rehab = 100.00' / Station / Lane)

RANDOM CRACK ROUT & SEAL

\$2.00 / LIN FT

\$2.00 / LIN FT

#### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

VEAR 10
PAVEMENT PATCH CLASS B
PAVEMENT PATCH CLASS B
PWFn =   0.7441   PW =   0.7441   X   \$2,400   \$1,766
YEAR 15
PAVEMENT PATCH CLASS B
PWFn = 0.6419
YEAR 20
PAVEMENT PATCH CLASS B
PAVEMENT PATCH CLASS B
SHOULDER PATCH CLASS C   0.50%   9 SQ YD   \$145.00   \$1,305   \$1,305   \$1,000   \$1,000   \$3,920   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1,000   \$1
LONGITUDINAL SHLD JT R&S   100.00%   3,920 LIN FT   \$2.00   \$7,840
CENTERLINE JT R&S   100.00%   9,800 LIN FT   \$2.00   \$19,600     PWFn =   0.5537   PW =   0.5537   \$75,845   \$41,994     YEAR 25
PWFn = 0.5537
PAVEMENT PATCH CLASS B   3.00%   470 SQ YD   \$150.00   \$70,500   \$150.00   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465
PAVEMENT PATCH CLASS B   3.00%   470 SQ YD   \$150.00   \$70,500   \$150.00   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465   \$2,465
SHOULDER PATCH   CLASS C   1.00%   17   SQ YD   \$145.00   \$2,465   PWFn = 0.4776   PW = 0.4776   X   \$72,965   \$34,848
PWFn = 0.4776   PW = 0.4776   X \$72,965   \$34,848
YEAR 30   INTERSTATE
PAVEMENT PATCH CLASS B   4.00%   627 SQ YD   \$150.00   \$94,050   SHOULDER PATCH CLASS C   1.50%   26 SQ YD   \$145.00   \$3,770   STOULDER PATCH CLASS C   1.50%   26 SQ YD   \$145.00   \$3,770   STOULDER PATCH CLASS C   1.50%   26 SQ YD   \$145.00   \$3,770   STOULDER PATCH CLASS C   1.50%   26 SQ YD   \$21.85   \$342,591   STOULDER PATCH CLASS C   STOULDER PATCH CLASS C   STOULD CONTROL CONTR
SHOULDER PATCH CLASS C
HMA POLICY OVERLAY 3.75" (PVMT)   100.00%   15,680 SQ YD   \$21.85   \$342,591
HMA POLICY OVERLAY 3.75" (SHLD)
PWFn = 0.4120 PW = 0.4120 X \$466,753 \$192,296    YEAR 35   INTERSTATE
YEAR 35   INTERSTATE
LONGITUDINAL SHLD JT R&S   100.00%   3,920 LIN FT   \$2.00   \$7,840
LONGITUDINAL SHLD JT R&S   100.00%   3,920 LIN FT   \$2.00   \$7,840
CENTERLINE JT R&S 100.00% 9,800 LIN FT \$2.00 \$19,600 RANDOM CRACK R&S 50.00% 5,880 LIN FT \$2.00 \$11,760 REFLECTIVE TRANSVERSE CRACK R&S 40.00% 3,773 LIN FT \$2.00 \$7,546 PD PVMT PATCH M&F HMA SURF 1.50" 0.10% 16 SQ YD \$79.54 \$1,273 PWFn = 0.3554 PW = 0.3554 X \$48,019 \$17,065
RANDOM CRACK R&S 50.00% 5,880 LIN FT \$2.00 \$11,760 REFLECTIVE TRANSVERSE CRACK R&S 40.00% 3,773 LIN FT \$2.00 \$7,546 PD PVMT PATCH M&F HMA SURF 1.50" 0.10% 16 SQ YD \$79.54 \$1,273 PWFn = 0.3554 PW = 0.3554 X \$48,019 \$17,065
REFLECTIVE TRANSVERSE CRACK R&S 40.00% 3,773 LIN FT \$2.00 \$7,546 PD PVMT PATCH M&F HMA SURF 1.50" 0.10% 16 SQ YD \$79.54 \$1,273 PWFn = 0.3554 PW = 0.3554 X \$48,019 \$17,065
PD PVMT PATCH M&F HMA SURF 1.50"
YEAR 40         INTERSTATE           PAVEMENT PATCH CLASS B         0.50%         78 SQ YD         \$150.00         \$11,700
PAVEMENT PATCH CLASS B 0.50% 78 SQ YD \$150.00 \$11,700
PAVEMENT PATCH CLASS B 0.50% 78 SQ YD \$150.00 \$11,700
, , , , , , , , , , , , , , , , , , , ,
[LONGITODINAL SHLD JT R&S 100.00% 3,920 LIN FT \$2.00 \$7,840
CENTERLINE JT R&S 100.00% 9,800 LIN FT \$2.00 \$19,600
REFLECTIVE TRANSVERSE CRACK R&S 60.00% 5,659 LIN FT \$2.00 \$11,318
RANDOM CRACK R&S 50.00% 5,880 LIN FT \$2.00 \$11,760
PD PVMT PATCH M&F HMA SURF 1.50" 0.50% 78 SQ YD \$79.54 \$6.204
PWFn = 0.3066 PW = 0.3066 X \$68,422 \$20,975
\$311,949
ROUTINE MAINTENANCE ACTIVITY 2.23 Lane Miles \$0.00 \$0 \$0
MAINTENANCE LIFE-CYCLE COST \$311,949
45 YEAR LIFE CYCLE CRFn = 0.0407852 MAINTENANCE ANNUAL COST PER MILE \$34,274

LIFE-CYCL	E COST ANALYSIS:	NEW DESIGN	Calculated / Revised :	9/23/14 8:02 AM			
			JPCP	НМА			
CONSTRUCTION	INITIAL COST	PRESENT WORT		\$1,433,167			
		ANNUAL COST PER MIL	.E \$165,413	\$157,462			
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORT	'H \$311,949	\$501,098			
		ANNUAL COST PER MIL	E \$34,274	\$55,056			
TOTAL	LIFE-CYCLE COST	PRESENT WORT	'H \$1,817,477	\$1,934,265			
		ANNUAL COST PER MIL		\$212,518			
LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY							
LOWEST COST OPT	ON ========		⇒ JPCP	\$199,687			
OTHER OPTIONS (LC	WEST TO HIGHEST):	TYPE / PERCENTAG	E HMA	\$212,518	6.4%		

S:\GEN\WPDOCS\Pavement Designs\D-1\l-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[Roosevelt Rd Ramp IDOT Mechanistic.xlsm]LifeCycleCost

**IDOT MECHANISTIC PAVEMENT DESIGN** Printed: 08/26/2019

PROJECT AND TRAFFIC INPUTS (Enter Data in Gray Shaded Cells) Route: Taylor Street Ramps at I-90/94 Comments: Circle Interchange Project Contract 62A76 & 62A77 Section: 2015-019R County: Cook Design Date: 08/02/2019 ONP <-- BY Location: Circle Interchange Modify Date: <-- BY ADT Year Current: 10,600 2012

Facility Type Interstate or Freeway ** Ramp Design Fig. 54-1.B ** Future: 11,000 2040

Crossroad? Unmarked State Route # of Lanes = 1 Lane Ramp

# of Lanes = Structural Design Traffic Minimum % of ADT in Actual %of Actual Road Class: ı ADT ADT Total ADT Design Lane PV ≃ 91.0% P = 0 9,880 100% Subgrade Support Rating (SSR): 4.0% 100% Poor SU = 250 434 S = 543 Construction Year: 2020 MU = 750 5.0% M = 100% Design Period (DP) = 20 Struct. Design ADT 10,857 (2030) years

TRAFFIC FACTOR CALCULATION									
FLEXIBLE PAVEMENT		RAMP DESIGN MIN		RIGID PA	RIGID PAVEMENT				
Cpv =	0.15	0.15	50%	Cpv =	0.15	0.15	50%		
Csu =	132.5	112.06	50%	Csu =	143.81	135.78	50%		
Cmu =	482.53	385,44	50%	Cmu =	696.42	567.21	50%		
TF flexible (Actual) =	6.42	(Actual ADT)	3.17	TF rigid (Actual) =	8.84	(Actual ADT)	4.59		
TF flexible (Min) =	3.17	(Min ADT Fig. 54-	2.C)	TF rigid (Min) =	4.59	(Min ADT Fig.	54-2.C)		

NEW CONSTRUCTION / RECONSTRUCTION PAVEM	ENT DESIGN CALCULATIONS
Full-Depth HMA Pavement	JPC Pavement
Use TF flexible = 6.42 PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)	Use TF rigid = 8.84 Edge Support = Tied Shoulder or C.&G.
Goto Map HMA Mixture Temp. = 74.5 deg. F (Fig. 54-5.C)  Design HMA Mixture Modulus (E _{HMA} ) = 710 ksi (Fig. 54-5.D)	Rigid Pavt Thick. = 9.75 in. (Fig. 54-4.E)
Design HMA Strain ( $\varepsilon_{HMA}$ ) = 71 (Fig. 54-5.E)	CRC Pavement
Goto Map Full Depth HMA Design Thickness = 11.25 in. (Fig. 54-5.F) Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)	Use TF rigid = 8.84 IBR value = 3
Use Full-Depth HMA Thickness = 11.25 inches	CRCP Thickness = 8.75 in. (Fig. 54-4.M)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS								
HMA Overlay of Rubblized PCC	Unbonded Concrete Overlay							
Use TF flexible = 6.42 HMA Overlay Design Thickness = 8.50 in. (Fig. 54-5.U)  Goto Map Limiting Strain Criterion Thickness = 10.75 in. (Fig. 54-5.V)	Review 54-4.03 for limitations and special considerations.							
Use HMA Overlay Thickness = 8.50 inches	JPCP Thickness = NA inches							

CONTACT BMPR FOR ASSISTANCE

## DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more	2 lanes with ADT > 2000	2 Lanes	2 Lanes
Part of a future 4 lanes or more One-way Streets with ADT > 3500	One way Street with ADT <= 3500	(ADT 750 -2000)	(ADT < 750)

	Min. Str. Design Traffic (Fig 54-2.C)					
Facility Type	PV	SU*	MU*			
Interstate or Freeway	0	500	1500			
Other Marked State Route	0	250	750			
Unmarked State Route	0	250	750			

Use marked route minimums for unmarked routes (Fig. 54-1.B)

	Traffic Factor ESAL Coefficients							
	Rigid (	Fig. 54-4.C)	Flexible (Fig. 54-5.B					
Class	Csu	Cmu	Csu	Cmu				
J	143.81	696.42	132.50	482.53				
II .	135.78	567.21	112.06	385.44				
III	129.58	562.47	109.14	384.35				
IV	129.58	562.47	109.14	384.35				

Class Table for					
One-Way Streets					
ADT Class					
0 - 3500	#				
>3501					

Class Table for					
2 or 3 lanes					
(not future 4 lane &					
not one-way street)					
ADT	Class				
0 - 749	Class IV				

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)						
		Rural	Urban				
Number of Lanes	Р	S	М	Р	Ş	М	
1 Lane Ramp	100%	100%	100%	100%	100%	100%	
2 or 3	50%	50%	50%	50%	50%	50%	
4	32%	45%	45%	32%	45%	45%	
6 or more	20%	40%	40%	8%	37%	37%	

8DE 5401 Template (Rev. 09/05/2013)

# LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## **FULL-DEPTH HMA PAVEMENT**

Standard Design

Printed: 08/26/2019

ROUTE I-29 SECTION	D Mainline near Morgan St 2013-012R				
COUNTY	Cook	(			
LOCATION	Circle Interchange	<b>)</b>			
FACILITY TYPE	INTERSTATE	ŧ			
PROJECT LENGTH		)FT ==>	0.37	Miles	
# OF CENTERLINES # OF LANES	_	CL LANES			
# OF EDGES	2	EP .			
LANE WIDTH - AVERAGE SHOULDER WIDTH HMA Left		P. FT I. FT			
HMA Right		FT			
Total Width of Paved Sho	uiders 8	FT			
PAVEMENT THICKNESS (FLEXIBLE)	14.50	IN	14 75	IN MAX	
SHOULDER THICKNESS	8.00	IN			d Design
POLICY OVERLAY THICKNESS	3.75	i IN			
FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ı	ACTUAL		USE
	5.85		26.89		26.89
200000000000000000000000000000000000000					Read Me
HMA COST PER TON HMA SURFACE			UNIT PRICE		
HMA TOP BINDER			\$113.60 \$96.95		
HMA LOWER BINDER HMA BINDER (LEVELING)			\$65.35		
HMA SHOULDER		Observation to the contract of	\$96.95 \$72.00		
The second secon	MATERIAL PROPERTY OF THE PROPE		production ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	COPPLETE MERCUCAL PROPERTY	mount (o. 2020) to act to accident feature
INITIAL COSTS					
ITEM THICKNESS	100% QUANTITY	UNIT	UNIT PRICE		COST
HMA PAVEMENT (FULL-DEPTH) (14.50°)	15,680	AND *		recent	\$000 B30
	•		\$62.63		\$982,038
HMA SURFACE COURSE (2.00") HMA TOP BINDER COURSE (2.25")			\$113.60 \$96.95		\$0 \$0
HMA LOWER BINDER COURSE (10.25")	9,196		\$65.35		\$0
HMA SHOULDER (8.00")		TONS	\$72.00		\$56,197
CURB & GUTTER	0	LIN FT	\$30,00	/UN FT	\$0
SUBBASE GRAN MATL TY C (TONS) IMPROVED SUBGRADE: Aggregate		TONS	\$25.00		\$15,150
	18,166 18,166	SUYD	\$1.00	/ SQ YD	\$127,162
Reserved For User Supplied Item Reserved For User Supplied Item	t contract the contract to the	UNITS		/ UNITS / UNITS	\$0 \$0
••					
PAVEMENT REMOVAL SHOULDER REMOVAL	15,680 1,742	SQ YĐ SQ YĐ	\$15.00 \$10.00		\$235,200 \$17,420
Note: * Denotes User Supplied Quantity	FLEXIBLE CON	STRUCTION	VINITIAL COST		\$1,433,167
	LEXIBLE CONSTRUCTION				\$157,462
MAINTENANCE COSTS:					
THICKNESS	MATERIAL		UNIT COST		
ROUTINE MAINTENANCE ACTIVITY			\$0.00	LANE-MIL	.E / YEAR
HMA OVERLAY PVMT SURF (2.00")	Surface Mix	2 60	\$12.75	/ SQ YD	
HMA OVERLAY PVMT (3.75")	0001	5.78	\$21.85	/SQ YD	
HMA SURFACE MIX (1.50") HMA BINDER MIX (2.25")			\$9.56 \$12.29	/ SQ YD	
HMA OVERLAY SHLD (Year 30) (1.75")	Shoulder Mix	5.70	\$7.06	/SQ YD	
HMA OVERLAY SHLD (2.00")	Shoulder Mix	2.00	\$8.06	/ SQ YD	
MILLING (2.00 IN)		2.00	\$3.00	/ SQ YD	
PARTIAL DEPTH PVMT PATCH (Mill & Fill Surf)			\$82.72		
PARTIAL DEPTH SHLD PATCH (Mill & Fill Surf)	Shoulder Mix	7.09	\$78.06	/ SQ YD	
PARTIAL DEPTH PVMT PATCH (Mill & Fill +2.00 *)	<del>-</del>		\$80.86		
PARTIAL DEPTH SHLD PATCH (Mill & Fill +2.00 *)	Shoulder Mix	3.150	\$78.06	/ SQ YD	
LONGITUDINAL SHOULDER JOINT ROUT & SEAL CENTERLINE JOINT ROUT & SEAL	* .			/LINFT	
RANDOM / THERMAL CRACK ROUT & SEAL	(100% Rehab = 110.00' / Stati	on / Lane)		/LINFT	

# FULL-DEPTH HMA PAVEMENT HMA OVERLAY OF RUBBLIZED PCC PAVEMENT Figure 54-7.C STANDARD DESIGN

PRESEN WORT	COST	IIT COST	UNIT L	QUANTITY	%		ITEM	COSTS:
***************************************							Υ	YEAR 5
	\$7,840	\$2.00	I IN FT	3,920	100.00%		LONG SHLD JT R&S	TEAR 3
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
40	\$1,324	\$82.72	SQ YD	16	0.10%		PD PVMT PATCH M&F SURF	
\$35,97	\$41,700	0.8626 X	PW =		0.8626	PWFn =		
								YEAR 10
	\$7,840	\$2.00		3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936 \$6,452	\$2.00 \$82.72	LIN FT SQ YD	6,468	50.00% 0.50%		RNDM / THRM CRACK R&S PD PVMT PATCH M&F SURF	
\$34,84	\$46,828	0.7441 X	PW =	70	0.7441	PWFn≖	FD FYWIT FATOR WAT SORF	
, ,				····		•	*****	
	\$50,000	62.00		47 400	100 000		MILL PVMT & SHLD 2.00"	YEAR 15
	\$52,266 \$12,695	\$3.00 \$80.86	SQ YD SQ YD	17,422 157	100.00%	2 00"	PD PVMT PATCH M&F ADD'L	
	\$199,962	\$12,75		15.680	100.00%	2.00	HMA OVERLAY PVMT 2.00"	
	\$14,049	\$8.06		1,742	100.00%		HMA OVERLAY SHLD 2,00 "	
\$179,06	\$278,972	0.6419 X	PW =		0.6419	PWFn=		
	· · ·							YEAR 20
	\$7,840	\$2.00	INFT	3,920	100.00%		LONG SHLD JT R&\$	TEAR 20
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72	SQ YD	16	0.10%		PD PVMT PATCH M&F SURF	
\$23,08	\$41,700	0.5537 X	PW =		0.5537	PWFn =	•	
					····			YEAR 25
	\$7,840	\$2.00		3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S PD PVMT PATCH M&F SURF	
\$22,36	\$6,452 \$46,828	\$82.72 0.4776 X	SQ YD PW =	/0	0.50% 0.4776	PWFn≂	PD FVMI PAICH MAF SURF	l
422,000			. 17				HMA_SD ·	
							INTERSTATE	YEAR 30
	\$47,040	\$3.00		15,680	100.00%	0.00#	MILL PVMT ONLY 2.00"	
	\$25,390 \$1,327	\$80.86 \$78.06	SQ YD SQ YD		2.00% 1.00%		PD PVMT PATCH M&F ADD'L PD SHLD PATCH M&F SURF	
	\$342,591	\$21.85		15,680	100.00%	2.00	HMA OVERLAY PVMT 3.75"	
	\$12,293	\$7.06		1,742	100.00%		HMA OVERLAY SHLD 1.75"	
\$176,59	\$428,641	0.4120 X	PW =		0.4120	PWFn =		'
		•		•				YEAR 35
	\$7,840	\$2.00	LIN FT	3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
	\$1,324	\$82.72	SQ YD	16	0.10%	***************************************	PD PVMT PATCH M&F SURF	
\$14,81	\$41,700	0.3554 X	PW =		0.3554	PWFn =		
		* * *		•				YEAR 40
	\$7,840	\$2.00		3,920	100.00%		LONG SHLD JT R&S	
	\$19,600	\$2.00		9,800	100.00%		CNTR LINE JOINT R&S	
	\$12,936	\$2.00		6,468	50.00%		RNDM / THRM CRACK R&S	
\$14,35	\$6,452 \$46,828	\$82.72 0.3066 X	SQ YD PW ≂	/8	0.50%	PWFn=	PD PVMT PATCH M&F SURF	ŀ
φ14,00	\$40,020	0.3000 X	E 44 m		0.5000	1 441 11 -		
\$501,09								
•	\$0	0.00	Lane Miles	2.23		IVITY	ROUTINE MAINTENANCE ACT	
\$501,096 \$55,050	CLE COST	ANCE LIFE-CY				CRFn = 0.0407	YEAR LIFE CYCLE	

**PCC PAVEMENT JPCP** 

ROUTE I-290 Mainline near Morgan St SECTION 2013-012R COUNTY Cook Circle Interchange LOCATION **FACILITY TYPE** INTERSTATE PROJECT LENGTH 1960 FT ==> 0.37 Miles # OF CENTERLINES 5 CL # OF LANES 6 LANES # OF EDGES 2 EP LANE WIDTH - AVERAGE 12 FT SHOULDER WIDTH PCC 4 FT Left PCC Right 4 FT Total Width of Paved Shoulders 8 FT PAVEMENT THICKNESS (RIGID) JPCP 11.00 IN TIED SHLD SHOULDER THICKNESS 11.00 IN POLICY OVERLAY THICKNESS 3.75 IN RIGID PAVEMENT TRAFFIC FACTORS MINIMUM ACTUAL USE 37 44 37 44 8.26 Worksheet Construction Type is Reconstruction The Pavement Type is **JPCP INITIAL COSTS** ITEM **THICKNESS** 100% QUANTITY UNIT **UNIT PRICE** COST JPC PAVEMENT (11.00") 15,680 SQ YD \$47.42 /SQYD \$743,546 PAVEMENT REINFORCEMENT 0 SQYD \$22.00 / SQ YD STABILIZED SUBBASE (4.00") 16,333 SQ YD \$19.00 /SQYD \$310,327 PCC SHOULDERS 1.742 SO YO \$40.00 / SO YD \$69,680 **CURB & GUTTER** 0 LIN FT \$30.00 /LIN FT \$0 SUBBASE GRAN MATL TY C (~1.721) 235 TONS \$25.00 /TON \$5,875 IMPROVED SUBGRADE: Aggregate Wildow 61 3 17,640 SQ YD \$7.00 / SQ YD \$123,480 Reserved For User Supplied Item \$0.00 / UNITS 0 UNITS \$0 Reserved For User Supplied Item 0 UNITS \$0,00 / UNITS \$0 PAVEMENT REMOVAL 15,680 SQ YD \$15.00 /SQ YD \$235,200 SHOULDER REMOVAL 1,742 SQ YD \$10.00 / SQ YD \$17,420 Note: * Denotes User Supplied Quantity RIGID CONSTRUCTION INITIAL COST \$1,505,528 RIGID CONSTRUCTION ANNUAL COST PER MILE \$165,413 **MAINTENANCE COSTS: THICKNESS** MATERIAL ITEM **UNIT COST** ROUTINE MAINTENANCE ACTIVITY \$0.00 / LANE-MILE / YEAR HMA POLICY OVERLAY (3.75")HMA POLICY OVERLAY PVMT (3.75") \$21.85 / SQ YD HMA SURFACE MIX (1.50") \$9.56 / SQ YD Surface Mix HMA BINDER MIX 2.25" Top Binder Mix \$12.29 / SQ YD HMA POLICY OVERLAY SHLD (3.75") \$15.12 /SQ YD Shoulder Mix CLASS A PAVEMENT PATCHING \$195.00 / SQ YD CLASS B PAVEMENT PATCHING \$150.00 / SQ YD CLASS C SHOULDER PATCHING \$145.00 / SQ YD PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf) Surface Mix \$79.54 / SQ YD PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 1.50") Surface Mix \$79.54 / SQ YD

(100% Rehab = 100.00' / Station / Lane)

LONGITUDINAL SHOULDER JOINT ROUT & SEAL

REFLECTIVE TRANSVERSE CRACK ROUT & SEAL

CENTERLINE JOINT ROUT & SEAL

RANDOM CRACK ROUT & SEAL

\$2.00 / LIN FT

\$2.00 / LIN FT

\$2.00 / LIN FT

\$2.00 / LIN FT

#### JOINTED PLAIN CONCRETE PAVEMENT UNBONDED JOINTED PLAIN CONCRETE OVERLAY Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	' UNIT	UNIT COST	COST	PRESENT WORTH
YEAR 10			<u>'</u>				
	PAVEMENT PATCH CLASS B	0.10%	16	SQ YD	\$150.00	\$2,400	
	PWFn =	0.7441		PW≂	0.7441 X	\$2,400	\$1,786
YEAR 15	.1					<del></del> -	
	PAVEMENT PATCH CLASS B	0.20%	31	SQ YD	\$150.00	\$4,650	
	PWFn =	0.6419		PW =	0.6419 X	\$4,650	\$2,985
YEAR 20					0.150.00		
	PAVEMENT PATCH CLASS B	2.00%		SQ YD	\$150.00	\$47,100	
	SHOULDER PATCH CLASS C	0.50%		SQ YD	\$145.00	\$1,305	
	LONGITUDINAL SHLD JT R&S	100.00%		LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	044.004
	PYVFN=	0.5537		PW =	0.5537 X	\$75,845	\$41,994
YEAR 25							
•	PAVEMENT PATCH CLASS 8	3.00%	470	SQ YD	\$150.00	\$70,500	
	SHOULDER PATCH CLASS C	1.00%	17	SQ YD	\$145.00	\$2,465	
	PWFn =	0.4776		PW =	0.4776 X	\$72,965	\$34,848
ſ <del>``</del> ./=.=	1			<u> </u>			
YEAR 30							
	PAVEMENT PATCH CLASS B	4.00%		SQ YD	\$150.00	\$94,050	
	SHOULDER PATCH CLASS C	1.50%		SQ YD	\$145.00	\$3,770	
	HMA POLICY OVERLAY 3.75" (PVMT)	100.00%		SQ YD	\$21.85	\$342,591	
	HMA POLICY OVERLAY 3.75" (SHLD)	100.00% 0.4120	1,742	SQ YD PW ≃	\$15.12 0.4120 X	\$26,342 \$466,753	\$192,296
	E 441.11 -	0.4120		r vv -	0.4120 A	\$400,700	\$192,290
YEAR 35	INTERSTATE						
	LONGITUDINAL SHLD JT R&S	100.00%	3,920	LIN FT	\$2.00	\$7,840	
	CENTERLINE JT R&S	100.00%	9,800	LIN FT	\$2.00	\$19,600	
	RANDOM CRACK R&S	50.00%	5,880	LIN FT	\$2.00	\$11,760	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	3,773	LIN FT	\$2.00	\$7,546	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.10%	16	SQ YD	\$79.54	\$1,273	
	PWFn =	0.3554		PW =	0.3554 X	\$48,019	\$17,065
YEAR 40	INTERSTATE						
[ 12AR 40	PAVEMENT PATCH CLASS B	0.50%	70	SQ YD	\$150.00	\$11,700	
	LONGITUDINAL SHLD JT R&S	100.00%		LINFT	\$2.00		
	CENTERLINE JT R&S	100.00%		LINFT	\$2.00	\$7,840 \$19,600	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%		LINFT	\$2.00	\$11,318	
	RANDOM CRACK R&S	50.00%		LINFT	\$2.00	\$11,760	
	PD PVMT PATCH M&F HMA SURF 1.50"	0.50%		SQ YD	\$79.54	\$6,204	
	PWFn=	0.3066	- 10	PW =	0.3066 X	\$68,422	\$20,975
					****** **		\$311,949
	ROUTINE MAINTENANCE ACTIVITY		2.23	Lane Miles	\$0.00	\$0	\$0
				MAINT	ENANCE LIFE-C	YCLE COST	\$311,949
45	YEAR LIFE CYCLE CRFn = 0.040	7852	M	AINTENANO	CE ANNUAL COS	T PER MILE	\$34,274

LIFE-CYCL	E COST ANALYSIS:	NEW DESIGN	Calcu	lated / Revised :	9/23/14 8:02 AM	
				JPCP	НМА_	
CONSTRUCTION	INITIAL COST	PRESENT WO ANNUAL COST PER		\$1,505,528 \$165,413	\$1,433,167 \$157,462	
************	LIES 01(0) E 400E					
MAINTENANCE	LIFE-CYCLE COST	PRESENT WO ANNUAL COST PER		\$311,949 \$34,274	\$501,098 \$55,056	
TOTAL	LIFE-CYCLE COST	PRESENT WO	RTH	\$1,817,477	\$1,934,265	
		ANNUAL COST PER		\$199,687	\$212,518	
			1.	4		
LIEF OVOLE COOT ANALYSIS - FILLS CLIEBLE -						
LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY						
LOWEST COST OPT	ION ======		===>	JPCP	\$199,687	
OTHER OPTIONS (LOWEST TO HIGHEST):		TYPE / PERCENT	AGE	AMH	\$212,518	6.4%

S:\GEN\WPDOCS\Pavement Designs\D-1\I-90-94 - at I-290 (Circle Interchange) - 62A76 62A77\[Taylor St Ramp IDOT Mechanistic.xlsm]LifeCycleCost